APPENDIX B

EXAMPLE LETTER TO APPROPRIATE AGENCIES

Indio Water Authority
Your Water. Our Responsibility.
83-101 Avenue 45, Indio, CA 92201 (760) 391-4038

September 23, 2011

Subject: Indio Water Authority – Urban Water Management Plan Update 2010 Notice

Dear Interested Parties,

Pursuant to Government Code 6066 and California Water Code § 10642, the Indio Water Authority wishes to inform you that the draft 2010 Urban Water Management Plan (UWMP) is now available for review on the IWA website, www.indiowater.org. Written comments will be accepted until December 6, 2011.

The IWA will also receive public comments on the 2010 UWMP at a public hearing on Tuesday, December 6, 2011 at 4:00 pm. The hearing will take place at City Hall in the City Council Chambers, 100 Civic Center Mall, Indio, California 92201.

California state law mandates that urban water purveyors update their UWMPs every five years. The City of Indio has enjoyed tremendous population growth in that time, and the new UWMP reflects this trend, describing a recycled water project, improved groundwater management, surface water treatment, and other means for securing additional supply over the next twenty years. In addition, the 2010 UWMP describes a range of conservation measures to be implemented concurrent with California's 2009 Water Conservation Act (SBx7-7) and the Coachella Valley Integrated Regional Water Management Plan.

Questions regarding the public hearing or the draft 2010 UWMP should be directed to Trevor Bisset, Water Resource Analyst, at (760) 625 1810.

Please send written comments before December 6, 2011 to:
Indio Water Authority
Attn: Water Resource Analyst
83-101 Avenue 45
Indio, CA 92201

Sincerely,

Debra Kaye

Debra Kaye, General Manager
Indio Water Authority

APPENDIX C

PUBLIC NOTICE ADVERTISEMENT AND ADOPTION RESOLUTION

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Indio Water Authority will hold a public hearing on December 13, 2011 at 4:00 p.m. or as soon thereafter as is possible, in the Indio Council Chambers located at 150 Civic Center Mall, Indio, California, to discuss and adopt the following:

Pursuant to Government Code 6066 and California Water Code § 10642, the Indio Water Authority (IWA) informs that the draft 2010 Urban Water Management Plan (UWMP) is now available for review on the IWA page of the City of Indio's website, www.indiowater.org. Written comments will be accepted until December 6, 2011.

The Indio Water Authority has completed the 2010 Urban Water Management Plan (Plan) and will consider adoption of the Plan.

Any party challenging the decision regarding the proposed action in court, may be limited to raising only those issues raised by the party or someone else at the public hearing or correspondence filed prior to or during the hearing. An opportunity will be given at said hearing for all interested persons to be heard.

If you are unable to attend the meeting, you may direct written comments to the Indio Water Authority, attention: Debra Kaye, General Manager, at 83-101 Avenue 45, Indio, California or telephone to 760-625-1812. In addition, a copy of the Plan is available for review at Indio City Hall or the Indio Water Authority between the hours of 7:30 a.m. to 5:30 p.m. Monday through Thursday.

DATE: November 28, 2011

INDIO WATER AUTHORITY

CYNTHIA HERNANDEZ
SECRETARY

RESOLUTION NO. 2011-56

RESOLUTION OF THE INDIO WATER AUTHORITY OF THE CITY OF INDIO, CALIFORNIA, APPROVING THE 2010 INDIO URBAN WATER MANAGEMENT PLAN

Section 1. That certain 2010 Urban Water Management Plan which has been prepared in accordance with the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, a copy of which is on file in the office of the Secretary, is hereby approved.

Section 2. The Secretary shall certify to the adoption of this Resolution and shall cause this Resolution and this certification to be entered in the Book of Resolutions of the Water Authority of the City of Indio.

PASSED, APPROVED AND ADOPTED this13th day of December, 2011 by the following vote:

AYES: Barba, Friestad, Torres, Wilson, Holmes, Miller
NOES: None
ABSENT: Lamb, Tunis, Ramos Watson

GLENN MILLER, PRESIDENT

ATTEST:

CYNTHIA HERNANDEZ
SECRETARY

APPENDIX D

2008 ANNUAL WATER QUALITY REPORT


2008 ANNUAL
WATER
QUALITY
REPORT
INDIO
Water
Authority
INDIO WATER
AUTHORITY
Este informe contiene información muy
importante sobre su agua potable. Tradúzcalo o
hable con alguien que lo entienda bien.
Yucca Park, Indio, CA
PWS ID#: 3310020

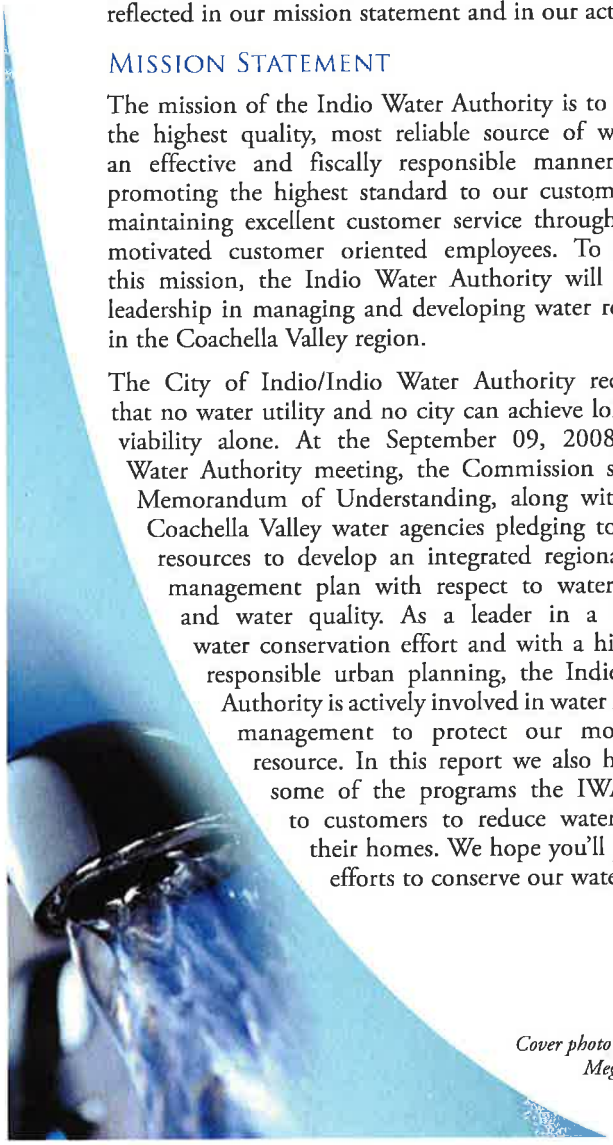
Utility Introduction

This water quality report contains information about the source, quality, and safety of our drinking water. In Indio, and in the Coachella Valley, we have access to drinking water that needs almost no treatment before being pumped to homes and businesses. We take hundreds of samples during the year to monitor for quality and safety. There are no violations or exceedances to report. The Indio Water Authority does not take this high-quality water for granted. Our commitment to protecting the water supply and serving our customers is reflected in our mission statement and in our actions.

Mission Statement

The mission of the Indio Water Authority is to provide the highest quality, most reliable source of water, in an effective and fiscally responsible manner, while promoting the highest standard to our customers and maintaining excellent customer service through highly motivated customer oriented employees. To achieve this mission, the Indio Water Authority will provide leadership in managing and developing water resources in the Coachella Valley region.

The City of Indio/Indio Water Authority recognizes that no water utility and no city can achieve long-term viability alone. At the September 09, 2008, Indio Water Authority meeting, the Commission signed a Memorandum of Understanding, along with other Coachella Valley water agencies pledging to devote resources to develop an integrated regional water management plan with respect to water supply and water quality. As a leader in a regional water conservation effort and with a history of responsible urban planning, the Indio Water Authority is actively involved in water resource management to protect our most vital resource. In this report we also highlight some of the programs the IWA offers to customers to reduce water use at their homes. We hope you'll join our efforts to conserve our water.



Cover photo courtesy of Megan Keane.

Substances That Could Be in Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material and can pick up substances resulting from the presence of animals or from human activity.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (U.S. EPA) and the State Department of Public Health (Department) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;

Inorganic Contaminants, such as salts and metals, that can be naturally occurring or can result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

Pesticides and Herbicides that may come from a variety of sources, such as agriculture, urban stormwater runoff, and residential uses;

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and which can also come from gas stations, urban stormwater runoff, agricultural applications, and septic systems;

Radioactive Contaminants that can be naturally occurring or can be the result of oil and gas production and mining activities.

More information about contaminants and potential health effects can be obtained by calling the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Where Does My Water Come From?

The Indio Water Authority drinking water source is derived exclusively from the lower Coachella Valley Ground Water Basin that lies roughly 500' to 1,300' below the ground surface in Indio. Water from the basin is pumped to the surface using eighteen (18) deep wells. The IWA plans to add two (2) new wells sites by 2009. All of these wells are sampled and monitored continuously throughout the year to ensure the safety of the drinking water supply. Water from the well sites is pumped either directly into water mains or into five (5) above ground reservoirs. Water from the reservoirs is then fed into the water mains depending on the demand. In every case, the groundwater is first treated with a small dosage of sodium hypochlorite before it is pumped into the distribution system. Sodium hypochlorite (chlorine) is used as a disinfectant and is the only method of water treatment needed since the groundwater source is of extremely high quality.

New Five Million Gallon Reservoir Number 1A

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791.

Community Participation

The Indio Water Authority address is 83-101 Avenue 45, Indio, CA 92201. For customer inquiries and billing information, please contact a customer service representative at (760) 391-4038, during regular business hours.

You are invited to participate in our public forum and ask questions or voice your concerns about your drinking water. The IWA Board meets the first Tuesday of every month at 4:00 PM (1600 Hours) in the City of Indio Council Chambers located at 150 Civic Center Mall, Indio, CA 92201. Please contact the City of Indio administrative offices at (760) 391-4000 for further information regarding upcoming meetings. Also, customers are encouraged to use the Internet for information regarding the water system, including this water quality report and upcoming IWA meetings. The Indio Water Authority Web site address is www.indio.org.

> **WHEN THE WELL'S DRY, WE KNOW THE WORTH OF WATER.** —*Benjamin Franklin*

Source Water Assessment

A Source Water Assessment Plan (SWAP) updated in October 2004 is available at our office, located at 83-101 Avenue 45, Indio, CA 92201. This plan is an assessment of the delineated area around our listed sources through which contaminants, if present, could migrate and reach our source water. It also includes an inventory of potential sources of contamination within the delineated area and a determination of the water supply's susceptibility to contamination by the identified potential sources.

The sources are most vulnerable to the following activities, which are currently not associated with any detected contaminants: gas stations, high-density septic systems, sewer collections systems, and high-density housing. If you would like to review the Source Water Assessment Plan, please feel free to contact our office during regular office hours at (760) 391-4144.

Questions?

For more information about this report, or for any questions relating to your drinking water, please call (760) 391-4149 or email stoyoda@indio.org.

Lead and Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Water Conservation Programs

The Indio Water Authority invites you to work with us to conserve water. The IWA currently has the following water conservation programs in effect:

The Water Smart Landscaping Rebate Program

The Indio Water Authority offers a rebate to customers who replace grass with water-efficient landscaping. The rebate offers homeowners $1 per square foot, up to $750.00, for converting their front lawn to water smart landscaping. Commercial facilities qualify for up to a $1500.00 rebate.

Landscape audits

As part of the Water Smart Landscaping Program, residents can call to schedule a free landscape audit conducted at their residence. An agency representative will perform a site visit and assess the landscaping, sprinklers, and timers. Residents can learn about basic adjustments that could save water with the systems they currently have. Tips on water conservation are also provided.

Nuisance Water and Water Wasters

The Indio Water Authority actively tracks nuisance water that runs down streets from properties in the city. As these properties are identified, the owners are contacted and water waster notices are distributed. If the problem persists from the same property, code enforcement may become involved.

Education and Outreach

The Indio Water Authority offers free outreach to any school in Indio. A team from the agency will visit the school and talk to the students about where our water comes from, water conservation, and other environmental programs the City of Indio currently offers.

Upcoming Programs

A Smart Controller Rebate Program is currently being developed. This program will offer rebates to customers for replacing standard landscape controllers with new smart controllers. The new controllers are able to calculate the change in weather and adjust sprinkler times accordingly.

For more information on any of these programs, please call the Environmental Hotline at (760) 391-4129.

Test Results

The following table contains information about substances that were detected in the drinking water. The presence of a contaminant in the water does not necessarily indicate a health risk. We monitor the drinking water throughout the year. Monitoring frequency depends on several factors including historic data and potential hazard. The monitoring frequency is set by state and federal regulations. We monitor weekly, monthly, yearly and for some substances every 3 years. The water quality report contains the most recent data for substances that were found in the drinking water. The Indio Water Authority may sample more than what is required to meet our own high standards of data reliability.

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	PHG (MCLG) [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum (ppm)	2007	1	0.6	0.0247	ND–0.36	No	Erosion of natural deposits; residue from some surface water treatment processes
Arsenic (ppb)	2007	10	0.004	0.22	ND–1.8	No	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes
Barium (ppm)	2007	1	2	0.0456	0.027–0.094	No	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits
Chlorine (ppm)	2008	[4.0 (as Cl2)]	[4 (as Cl2)]	0.50	ND–0.82	No	Drinking water disinfectant added for treatment
Chromium (ppb)	2007	50	(100)	12.54	8.5–18	No	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
Fluoride (ppm)	2007	2.0	1	0.63	0.42–1.0	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Gross Alpha Particle Activity (pCi/L)	2007	15	(0)	3.2	ND–3.6	No	Erosion of natural deposits
Heterotrophic Plate Count Bacteria (Units)	2008	TT	NA	1.0	ND–16.0	No	Naturally present in the environment
Nitrate [as nitrate] (ppm)	2008	45	45	6.38	1.7–22	No	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
TTHMs [Total Trihalomethanes] (ppb)	2008	80	NA	0.7	ND–3.8	No	By-product of drinking water chlorination
Total Coliform Bacteria (% positive samples)	2008	More than 5.0% of monthly samples are positive	(0)	1	NA	No	Naturally present in the environment
Uranium (pCi/L)	2007	20	0.43	3.0	2.9–3.1	No	Erosion of natural deposits

Tap water samples were collected for lead and copper analyses from sample sites throughout the community (Lead was not detected at the 90th percentile)

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2007	1.3	0.3	0.0805	0/30	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	PHG (MCLG)	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum (ppb)	2007	200	NS	24.72	ND–360	No	Erosion of natural deposits; residual from some surface water treatment processes
Chloride (ppm)	2007	500	NS	13.1	5.5–36	No	Runoff/leaching from natural deposits; seawater influence
Color (Units)	2008	15	NS	ND	ND–3	No	Naturally occurring organic materials
Copper (ppm)	2007	1.0	NS	0.00316	ND–0.04	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Iron (ppb)	2007	300	NS	29	ND–320	No	Leaching from natural deposits; industrial wastes
Manganese (ppb)	2007	50	NS	0.678	ND–8.5	No	Leaching from natural deposits
Odor–Threshold (TON)	2008	3	NS	1	1–2	No	Naturally occurring organic materials
Specific Conductance (Units)	2007	1,600	NS	359	277–817	No	Substances that form ions when in water; seawater influence
Sulfate (ppm)	2007	500	NS	36	18–100	No	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (ppm)	2007	1,000	NS	217	160–432	No	Runoff/leaching from natural deposits
Turbidity (NTU)	2008	5	NS	0.15	ND–0.8	No	Soil runoff
Zinc (ppm)	2007	5.0	NS	0.0056	ND–0.064	No	Runoff/leaching from natural deposits; industrial wastes

UNREGULATED AND OTHER SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH
Chromium VI [Hexavalent Chromium] (ppb)	2004	12.1	3.7–19.4
Hardness (ppm)	2007	104	52–200
Sodium (ppm)	2007	30	20–44
Vanadium (ppb)	2007	14.5	11–23

Definitions

AL (Regulatory Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

µS/cm (microsiemens per centimeter): A unit expressing the amount of electrical conductivity of a solution.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs (SMCLs) are set to protect the odor, taste, and appearance of drinking water.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. EPA.

MRDL (Maximum Residual Disinfectant Level): The level of a disinfectant added for water treatment that may not be exceeded at the customer's tap.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. EPA.

NA: Not applicable.

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NS: No standard.

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

pCi/L (picocuries per liter): A measure of radioactivity.

PDWS (Primary Drinking Water Standard): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG (Public Health Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California EPA.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

TON (Threshold Odor Number): A measure of odor in water.

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

APPENDIX E

CONSERVATION MASTER PLAN

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Abbreviations and Acronyms

A list of abbreviations used in this report is presented below.

AB	Assembly Bill
ACP	Aggressive Conservation Plan
AF	acre-foot, acre-feet
AFY	acre-feet per year
APAI	Alan Plummer Associates, Inc.
AWWA	American Water Works Association
AWWARF	American Water Works Association Research Foundation
B&V	Black & Veatch
Bay-Delta	San Francisco Bay – California Sacramento-San Joaquin Delta
BCP	Baseline Conservation Plan
BMPs	Best Management Practices
cfs	cubic feet per second
CII	commercial, industrial, and institutional
CIMIS	California Irrigation Management Information System
CMP	Conservation Master Plan
COMM	commercial
CRW	Colorado River water
CT	construction
CUWCC	California Urban Water Conservation Council
CVAG	Coachella Valley Association of Governments
CVWD	Coachella Valley Water District
Delta	California Sacramento-San Joaquin Delta
DMMs	demand management measures
DWR	California Department of Water Resources
DUs	dwelling units
EPAct	Energy Policy Act
ETo	evapotranspiration
F	degrees Fahrenheit
FY	Fiscal Year
GHG	greenhouse gas
GIS	geographic information system
gpcd	gallons per capita per day
gpd/unit	gallons per day per unit
gpf	gallons per flush
gpm	gallons per minute
HCF	hundred cubic feet
HECW	high-efficiency clothes washing machine
HET	high-efficiency toilet
HEU	high-efficiency urinals
HOAs	home owners associations

in.	inches
IR	irrigation
IRP	integrated resources planning
IRWD	Irvine Ranch Water District
IWA	Indio Water Authority
MBRs	membrane bio reactors
MCLs	maximum contaminant levels
MCP	Moderate Conservation Plan
MF	multi-family residential
MG	million gallons
MGD	million gallons per day
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
NCDENR	North Carolina Department of Environment and Natural Resources
NRW	non-revenue water
RV	recreational vehicle
SF	single-family residential
sq ft	square feet
SWP	State Water Project
SWRCB	California State Water Resources Control Board
SWTP	Surface Water Treatment Plant
UARL	Unavoidable Annual Real Losses
ULFT	ultra low flush toilet
USEPA	United States Environmental Protection Agency
UV	ultraviolet light
Valley	Coachella Valley
VSD	Valley Sanitary District
WADR	Water Agencies of the Desert Region
WEAP	Water Evaluation and Planning System
WF	water factor
WRDP	Water Resources Development Plan
WRF	water reclamation facility
WRP	water reclamation plant
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

Indio Water Authority (IWA) historically has implemented innovative programs to stretch water supplies and maximize resources. As part of its proactive efforts, IWA authorized Black & Veatch (B&V) to develop a Conservation Master Plan (CMP) to identify opportunities for conservation within IWA's service area and to develop an approach and implementation schedule for those opportunities, thereby reducing water demands and improving and sustaining IWA's long-term water resources. The CMP considers water demand for the next 20 years, existing water efficiency measures utilized by the City of Indio, the California Urban Water Conservation Council's (CUWCC) demand management measures (DMM), and other opportunities. This Executive Summary highlights the information presented in the CMP.

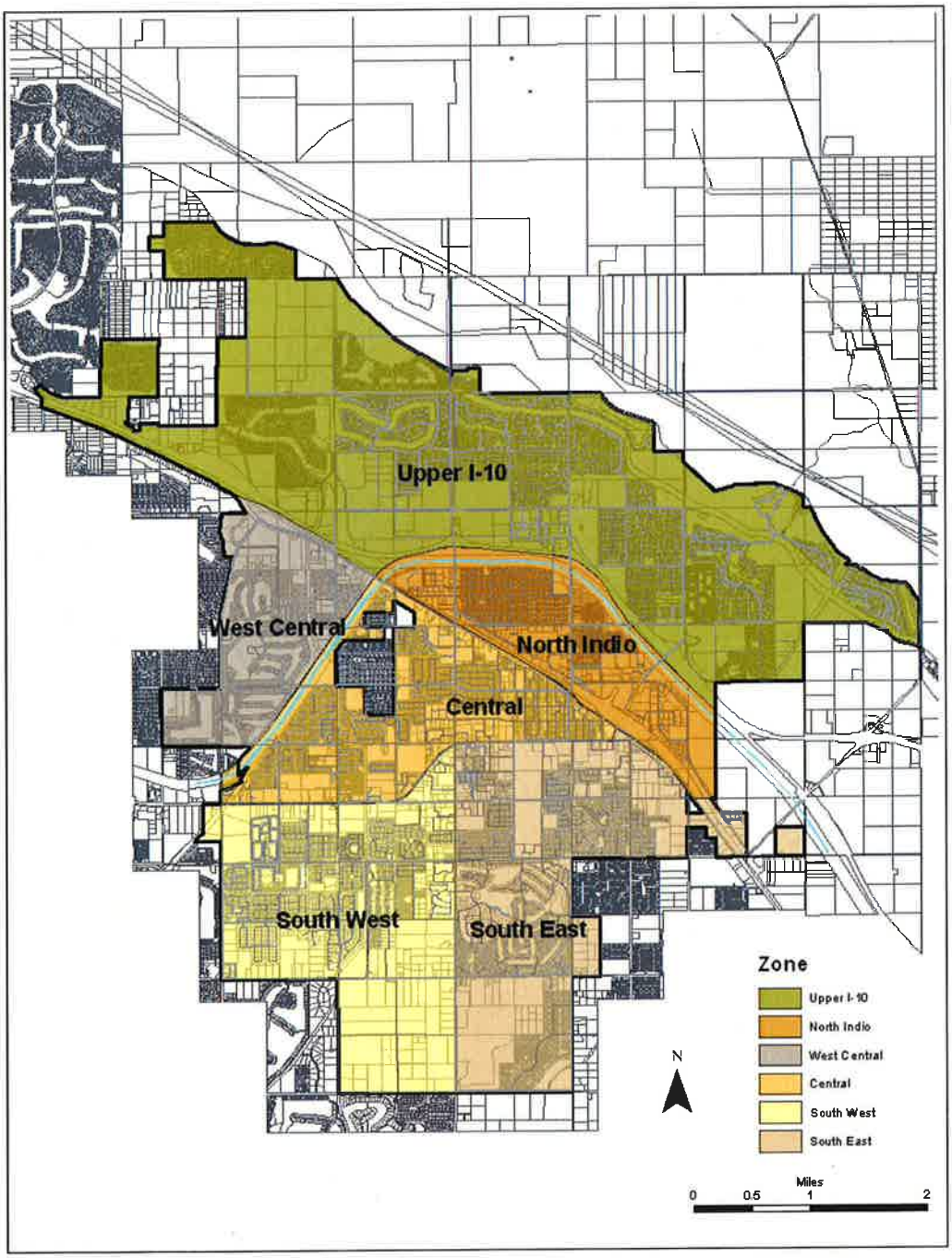
INTRODUCTION (Chapter 1)

Chapter 1 presents background information on the Coachella Valley (Valley), the City of Indio, and IWA, the City's water authority. Current water supplies are being stretched to respond to the effects of California's three-year drought and to meet additional demands resulting from recent growth. IWA has been investigating opportunities to develop a more sustainable water supply that will allow for continued growth. In 2008, a Water Resources Development Plan (WRDP) was developed providing a road map with an integrated approach to managing IWA's long-term water resources.

The WRDP strongly recommended that IWA consider implementing six different programs for improving the overall sustainability of their water resources: (1) an Urban Water Conservation Program, (2) an Agricultural Water Conservation Program including in lieu canal water for groundwater, (3) a Recycled Water Program, utilizing effluent from Valley Sanitary District's (VSD) wastewater treatment plant (WWTP), (4) a Surface Water Program to treat canal water from the Coachella Canal for potable supply, (5) a Groundwater Recharge Program utilizing spreading to reduce overdraft conditions, and (6) a Supplemental Recycled Water Program utilizing remotely located Membrane Bio Reactors (MBRs) to treat wastewater effluents for reuse. IWA moved quickly on these recommendations and authorized B&V to develop their Urban Water Management and Conservation Master Plan to further define conservation opportunities and establish a plan for implementation.

Other topics discussed in Chapter 1 include the local climate, the potential effects of global warming on State Water Project (SWP) entitlements and Colorado River Water (CRW) allocations to the Valley, and conservation-related legislation that would affect implementation of the CMP. Chapter 1 also introduces the Water Evaluation and Planning (WEAP) System, the software used for the integrated resources planning (IRP) model. By determining water use by location throughout the service area, the model provided a comprehensive and flexible framework for policy analysis. The IWA service area was divided into six zones, shown on Figure ES-1. Each of these zones was modeled in WEAP for seven demand Customer Classes: City, commercial, construction, irrigation, single-family residential, multi-family residential and other users.

Figure ES-1
Zones Established for Analyzing Water Consumption in the City of Indio



CONSERVATION GOALS (Chapter 2)

Chapter 2 describes the considerable benefits of urban water conservation, which extend beyond simply improving the reliability of a water supply and encompass broader objectives, such as environmental protection and increased sustainability. In addition, rate payers benefit when water agencies use an IRP approach to invest in the mix of supply- and demand-management strategies capable of meeting resource management objectives with the lowest overall cost and impacts.

IWA's goals for their urban conservation program are as follows.

- Contribute to mitigation of groundwater overdraft by reducing overall demand.
- Reduce or defer the need for developing new water resources.
- Maintain compliance with State legislation.
- Achieve or surpass 20 percent reduction in potable water consumption by 2020.

CURRENT WATER SUPPLY SOURCES, PLANNING, AND INFRASTRUCTURE (Chapter 3)

Local groundwater is the primary source of water supply in the Valley and supplies 100 percent of IWA's service area. Other Valley water sources are imported Colorado River Water including direct entitlements and waters exchanged for State Water Project water allocations; surface water diverted from local streams, and reuse water obtained from water reclamation plants (WRPs). Chapter 3 describes these water supply sources, discusses IWA's potable water system, and summarizes IWA's long-term water supply planning efforts to diversify their water portfolio by tapping into new resources and by reusing and conserving existing available resources. In addition to the Conservation Master Plan (CMP), IWA is currently in the process of developing feasibility studies for the use of recycled water and for the treatment of CRW from the Coachella Canal to reduce pumping of groundwater. These efforts are described in more detail in Chapter 3.

POPULATION FORECASTS AND END USER PROFILES (Chapter 4)

Similar to much of Southern California, the City of Indio experienced rapid growth in recent years until the economy slowed in 2008. Chapter 4 presents historical population forecasts, historic water use, water use by season, and per capita water use. Development has not occurred uniformly; development in some zones has exploded, while other zones have experienced very little development. The sizes of homes and parcels are also reflective of the period in which they were built. Zone-parcel analyses prepared for the CMP demonstrated that homes in the older zones of the City, North Indio, and Central area are smaller than homes in the newly developed areas, Upper I-10 and West Central. However, the parcel to building ratio is higher in these older

zones, indicating that the older regions may have potentially more sod or landscaping. This type of information is useful when targeting outdoor water use.

An analysis was performed of the 10 largest water users within each of seven Customer Classes: City, Commercial, Construction, Irrigation, Single-family Residential, Multi-family Residential, and others. The cumulative demand of these 70 accounts is nearly 15 percent of IWA's annual demands.

Table ES-1
Summary of the Analyses of the Largest Water Users by Customer Class

Option	Description of 10 Largest Accounts	Approximate water use per customer class	Water use per IWA's total demands for 2008
City Customer Class	City parks and sports facilities or golf courses	50 percent	2 percent
Commercial Customer Class	Hospitals, casinos, hotels/motels, laundry facilities, and others	17 percent	1.5 percent
Construction Customer Class	Construction projects	65 percent	1.2 percent
Irrigation Customer Class	Schools, home owners associations (HOAs), private golf courses, and country clubs	18 percent	1.5 percent
Single-family Residential Customer Class	Average parcel size of homes is 58,540 square feet (sq ft), nearly all of them located in the South West Zone	1percent	0.4 percent
Multi-family Residential Customer Class	Recreational vehicle (RV) parks and large apartment complexes, predominantly located in the Central and South East Zones	29 percent	3.8 percent
Other Users Customer Class	Public schools	51 percent	2.4 percent

Chapter 4 also describes non-revenue water (NRW), which can be described as the differences between the amounts of water produced (pumped) or treated and the amount actually consumed, which is based on metered/billing records. These system water losses may be attributed to leaks in the distribution system (real losses), but more often are a result of un-metered connections, meter inaccuracies, maintenance operations, storage overflows, street cleanings, and/or fire flows.

CURRENT WATER EFFICIENCY/CONSERVATION PROGRAMS (Chapter 5)

IWA's Conservation Program was initiated in 2008, utilizing many of the California Urban Water Conservation Council's (CUWCC's) Demand Management Measures (DMMs) as guidelines. In total, CUWCC has 14 DMMs to address and promote water efficiency and conservation. IWA has already implemented several of the DMMs and is further evaluating the remaining measures. Chapter 5 describes the DMMs and their implementation status by IWA.

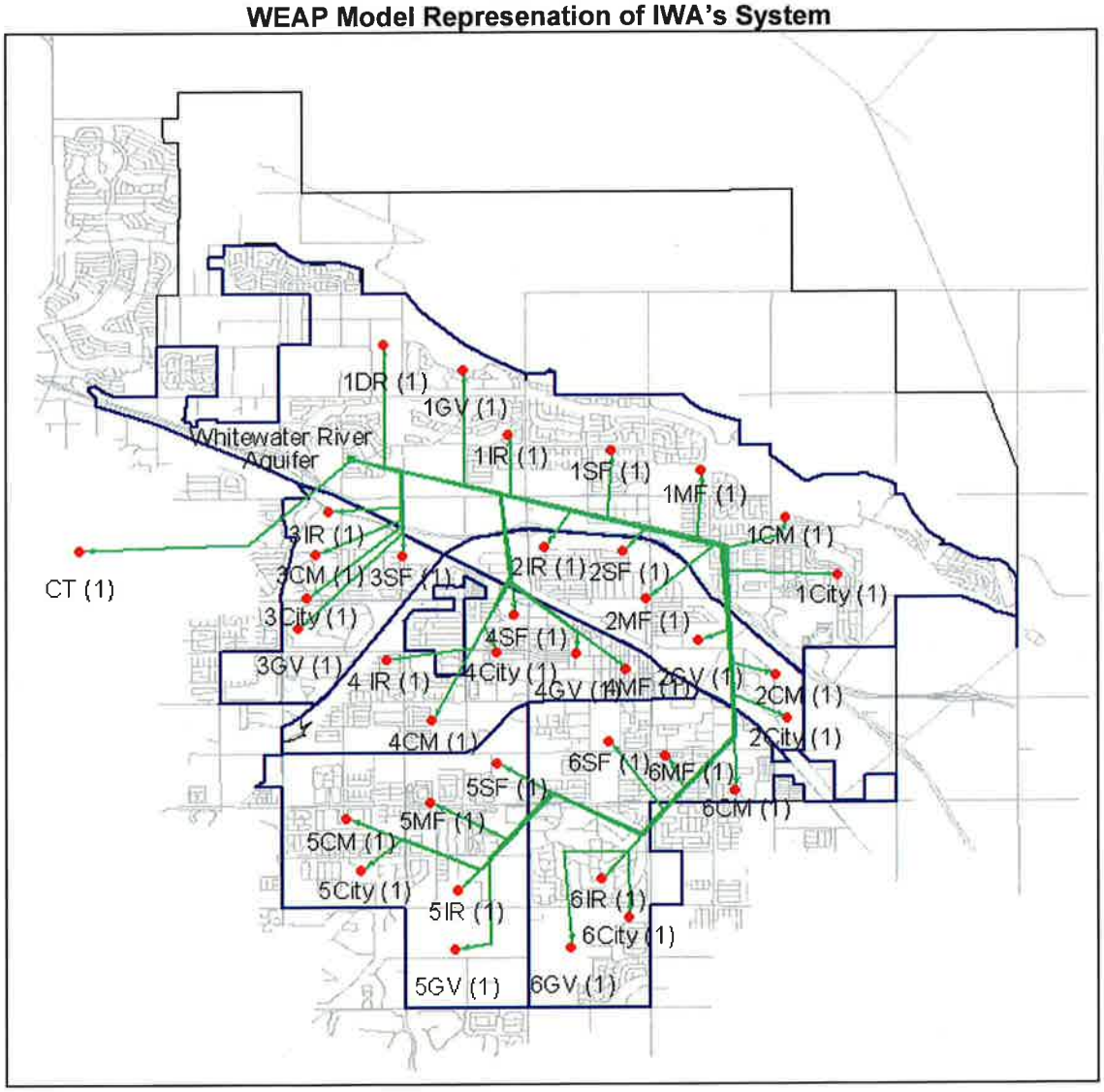
Table ES-2
CUWCC DMMs and IWA Implementation Status

No.	DMM	Status
1	Residential Surveys	Implemented
2	Residential Retrofits	Upgrades to irrigation systems implemented. Internal plumbing fixtures under evaluation.
3	System Water Audits	IWA's System Water Audit Program was started in 2001. The goal is to maintain < 2% water loss in the distribution system.
4	Metering	Implemented - 100% of IWA's customers are metered, and any new water users will require metering on their service connections. IWA will require separate meters for irrigation on all commercial, industrial, and apartment building properties by January 1, 2013.
5	Landscape	Implemented - Since 2008, IWA has taken several steps: ▸ Landscape and Water Conservation Ordinance ▸ Smart Controller Program ▸ Water Smart Landscape Rebate Program
6	Clothes Washers	Under Evaluation
7	Public Information	Implemented - IWA's Water Smart Education and Outreach Program was started in 2006 and has since expanded to include: ▸ Cooperative efforts with the Coachella Valley Association of Governments (CVAG) ▸ Memorandum of Understanding (MOU) with Valley water agencies ▸ Active membership in Water Agencies of the Desert Region (WADR)
8	School Education	Implemented as part of the Public Information Program.
9	Commercial, Industrial, and Institutional (CII)	Under Evaluation
10	Wholesale Incentives	Not Applicable
11	Rates	Under development to be implemented in May 2010
12	Conservation Coordinator	Implemented - IWA hired an Environmental Programs Coordinator hired in 2006 to facilitate conservation efforts and conservation programs.
13	Waste Prohibitions	Implemented
14	Residential Ultra-low Flow Toilet (ULFT) Replacement Programs	Under Evaluation

WATER EVALUATION AND PLANNING SYSTEM (Chapter 6)

Chapter 6 describes the principles of the WEAP model and the development of the WEAP model for the IWA service area. Data sources, assumptions and planning criteria, and growth projections are also discussed. The model of IWA's service area was set up as a series of demand nodes within each of the six defined zones. All of the demand nodes are supplied from a single supply node, representing the groundwater aquifer. Figure ES-2 illustrates the WEAP model's representation of the IWA system.

Figure ES-2
WEAP Model Represenation of IWA's System



Three scenarios were modeled using WEAP: (1) Baseline Conservation Plan (BCP), (2) Moderate Conservation Plan (MCP), representing a mid-range water conservation program, and (3) Aggressive Conservation Plan (ACP), aimed at maximizing water savings and achieving full implementation of programs sooner than the MCP. Table ES- 3 summarizes key components of the three scenarios. Table ES-4 quantifies water savings. Additional savings will be realized by implementation of the other Best Management Practices (BMPs) under the CUWCC's Memorandum of Understanding (MOU), of which IWA is a signatory.

Table ES-3
Summary of the Conservation Plan Scenarios

Item	BCP	MCP	ACP
Single Family Landscaping	*	▸ Re-landscaping program programs starts in 2010 ▸ Achieve re-landscaping to drought tolerant plants in 80% of homes by 2030 ▸ Achieve 60% reduction in irrigation water use	▸ Same as MCP, but achieves re-landscaping to drought tolerant plants in 100% of homes by 2030
Multi-Family Landscaping	*	▸ Re-landscaping program starts in 2010 ▸ Achieve re-landscaping to drought tolerant plants in 80% of accounts by 2030 ▸ Achieve 60% reduction in irrigation water use	▸ Same as MCP, but achieves re-landscaping to drought tolerant plants in 100% of accounts by 2030
Municipal Irrigation	*	▸ Re-landscaping program starts in 2010 ▸ Achieve re-landscaping to 100% of all accounts by 2020 ▸ Achieve 60% reduction in irrigation water use	▸ Same as MCP
Commercial Landscaping and Toilet Retrofit	*	▸ Not included in MCP	▸ Re-landscaping program and toilet retrofit programs start in 2010 ▸ Achieve 25% reduction in total water use
Single Family Toilets (conversion to new low flush toilets of 1.6 gallons per flush [gpf])	*	▸ Program starts in 2010 ▸ Change 80% of all toilets in homes built prior to 1992 by 2030 ▸ Achieve 30% water savings	▸ Same as MCP but achieves 100% change of toilets by 2030
Irrigator Supply Conversion	*	▸ WRF is on line by 2015 ▸ WRF capacity is at least 4 million gallons per day (MGD) with 100% of reclaimed water supply utilized by irrigators by 2020	▸ Same as MCP

The BCP Scenario projected demands without conservation programs assuming the current plumbing codes remain in place and natural replacement of fixtures continues at a normal rate.

Table ES-4
Estimated Cumulative Water Savings (AF) Through 2030 under the MCP and ACP

Program	MCP	ACP
Municipal Re-Landscaping	17,200	17,200
Residential Re-landscaping	100,300	114,600
Commercial Water Efficiency	Not Applicable	16,500
Residential Indoor conservation: Toilet replacement	1,500	1,700
Recycled Water (4 mgd)	62,700	62,700
PROGRAM SAVINGS	181,600	212,700

IMPROVED AND PROPOSED CONSERVATION STRATEGIES (Chapter 7)

Chapter 7 discusses additional implementation strategies for IWA to expand upon their existing implementation efforts for CUWCC DMMs and to move forward on DMMs previously under evaluation. These are summarized in Table ES-5.

Table ES-5
Proposed Conservation Strategies

No.	DMM	Status
1	Residential Surveys	IWA has implemented a portion of this program. Additional components to be implemented by July 1, 2011 and target to provide surveys to more than 15% of residential accounts.
2	Residential Retrofits	IWA should implement plumbing retrofit portion of this program by July 1, 2011 targeting the North Indio and Central Zones, where pre-1992 construction accounts for 97% and 77% of residences, respectively.
3	System Water Audits	IWA has already achieved the CUWCC goal of <10% unaccounted for water.
4	Metering	100 percent of IWA's customers are metered for water use, and IWA has probably already realized the savings associated with metering of all accounts. A tiered rate structure would be necessary to further reduce usage under this DMM.
5	Landscape	Additions to IWA's current programs should include implementation of a survey/ water audit program by July 1, 2012 targeting > 15% of large landscape irrigation accounts by 2021.
6	Clothes Washers	IWA should establish a High-Efficiency Clothes Washing (HECW) Machine financial incentive program to begin implementation by July 1, 2012 with full implementation in 2.5 years (2014).
7	Public Information	IWA should continue existing efforts.
8	School Education	IWA should implement an expanded school program, including tracking and documentation of results by July 1, 2011.
9	CII	By July 2, 2012, IWA will need to identify and rank CII customers by water use, develop a ULFT program, and either implement a CII water use survey and incentives program or establish and meet CII conservation performance targets.
10	Wholesale Incentives	Not Applicable
11	Rates	IWA has initiated a feasibility assessment of retail conservation pricing. As a signatory of CUWCC's MOU, the City of Indio is expected to implement conservation pricing by May, 2010.
12	Conservation Coordinator	IWA should continue existing efforts.
13	Waste Prohibitions	The City of Indio has passed two ordinances prohibiting waste of water. IWA should prohibit the remaining water waste components by July 1, 2011: ▸ Single-pass cooling system in all new connections. ▸ Non-recirculation system in all new conveyer car washes and commercial laundry systems. ▸ Non-recycling decorative water fountains.
14	Ultra Low Flush Toilet (ULFT) Replacement Programs	IWA should implement a residential ULFT replacement program by July 1, 2010.

Table ES-6 presents estimates for the minimum amount of progress that IWA should achieve through their DMM programs by 2015. Estimated costs for the first five years of their programs, through 2015, are also presented.

Table ES-6
Estimated Progress and Costs Through 2015 for Implentation of DMM Programs

No.	DMM	Implement by July 1	Progress by 2015	Estimated Program Cost by 2015 (Cumulative)
1	Residential Surveys	2011	Surveys provided to ≥ 1,400 residential accounts	$154,000 ($110/audit) [A]
2	Residential Retrofits Residential plumbing retrofits	2011	≥ 25% of pre-1992 dwelling units (DUs) retrofitted (=approximately 2.510 DUs)	$25,100 ($10/kit) [A]
3	System Water Audits	2011	Pre-screening audit performed annually	-
4	Metering	N/A	N/A	-
5	Landscape	2012	Surveys provided to ≥ 6% of CII and/or irrigation accounts (> 55 accounts)	$12,200 ($220/audit)
6	Clothes Washers	2012	1,490 HECW units installed through program	$149,000 ($100/HECW) [A]
7	Public Information	2011	Maintain program	$82,000 [B]
8	School Education	2011	Maintain program	$40,000 ($10/student/year)
9	CII	2012	▸ Ranked list by water use of CII users ▸ Accelerated ULFT retrofits to achieve 1.2% of Water Savings Potential ▸ Annual reporting to CUWCC ▸ Surveys & incentives supplied to 4% of CII customers OR reduce CII water use by approximately 100 AF	$6,000 ($60/AF saved)
10	Wholesale Incentives	N/A	N/A	-
11	Retail Conservation pricing	2011	Maintain rate structure once implemented in May 2010	-
12	Conservation Coordinator	2011	Maintain position and supporting staff	$2,467,000 [B]
13	Water Waste Prohibition	2011	Maintain prohibition	-
14	ULFT Replacement Program	2011	Water savings equivalent to ULFT retrofits in > 740 single-family homes built prior to 1992	$111,000 ($150/toilet)

[A] APAI, 2005.
[B] B&V, 2008c.

5-YEAR IMPLEMENTATION PLAN (Chapter 8)

Chapter 8 expands the CUWCC DMM implementation plan presented in Chapter 7 by also incorporating components from their current conservation program and a few new components and/or measures. Key components are summarized in Table ES-7.

Table ES-7
Potential Water Savings from Key Water Conservation Strategies

Strategy	Water Savings (AFY) by 2015	Water Savings (AFY) by 2020
New Ordinances ▸ Water Efficient Landscaping in Residential New Construction Ordinance (new residential construction desert landscaping) ▸ Prohibition of sale/installation on non ULFTs ▸ ULFT Retrofit upon resale	900 Up to 50 Up to 18	2,000 Up to 100 Up to 35
Re-landscaping of Municipal Properties and Medians	400	1,000
Water Smart Landscape Rebate Program	1,550	2,750

The programs in the 5-Year Plan are proposed to be initiated over the five-year period for FYs 2010 through 2014. An implementation schedule for the programs in this plan is provided for each fiscal year. The schedule does not include programs associated with CUWCC's DMMs. A five-year budget was developed corresponding to the 5-year implementation schedule and is presented in Table ES-8.

Table ES-8
Estimated Costs for the 5-year Implementation of Key Conservation Strategies

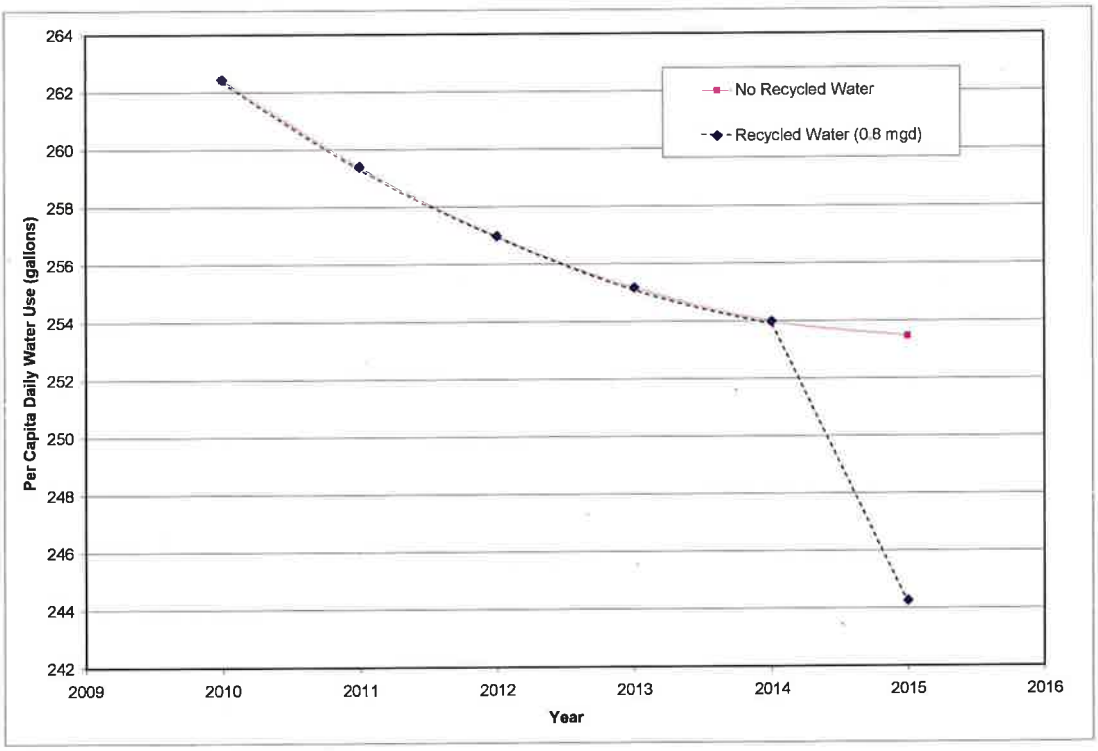
Program	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	5-Year Budget
Municipal Re-landscaping	$50,000	$150,000	$100,000	$100,000	$100,000	$500,000
Residential Re-landscaping & Smart Controller Program	$460,600	$ 460,600	$ 460,600	$ 460,600	$460,600	$2,303,000
DMMs	$479,700	$576,700	$647,500	$663,000	$679,100	$3,046,000
Annual Estimated Costs	$990,300	$1,187,300	$1,208,100	$1,223,600	$1,239,700	$5,849,000
Water Saved	400	900	1,370	1,850	2,340	6,900
Unit Cost ($/AF saved)	$2,251	$1,298	$877	$661	$533	$877

The Conservation Master Plan was designed to achieve at least a 20 percent reduction in the baseline per capita water use rate for all demand Customer Classes by 2020. IWA's baseline per capita water usage rate (2002-2008 average) has been estimated as 285 gallons per capita per day (gpcd). Since 2002, the City's gpcd use rate has been steadily declining as a result of new

development (modern plumbing fixtures and desert landscaping) and conservation efforts. In the six year period, it dropped from 275 in 2002 to 255 gpcd in 2008. Accounting for growth in all Customer Classes, the WEAP model estimates that the City of Indio's daily use rate for 2010 will be approximately 262 gpcd. This is a 9 percent decrease from the baseline rate. The targeted per capita water use rate for 2020 is 228 gpcd.

To meet this target, IWA will need to achieve water savings as proposed in this CMP and construct a WRF to supply irrigators with reclaimed water instead of the potable ground water that they are currently receiving. Figure ES-3 illustrates the resulting changes in per capita water usage through 2015. According to population and demand forecasts, IWA should project to achieve a per capita water use rate of 244 gpcd by 2015 in order to be on track to achieve 228 gpcd by 2020. For the purposes of this CMP, it has been assumed that a WRF will be brought online in 2015, initially supplying 0.8 mgd and ramping up to 4 mgd in 5 years (2020).

Figure ES-3
Per Capita Daily Water Usage (gallons) Through 2015 with CMP Programs Eith and Without a WRF On Line in 2015



A variety of opportunities for grant funding are available. Many of these grant opportunities require the applicant to provide matching funds ("local match"). Chapter 8 presents a summary of Federal and State funding sources, objectives, and available funds. These opportunities

include the Water 2025 Challenge Grants Program, the Water Conservation Field Services Program, Proposition 50 Water Use Efficiency Grants, Proposition 84 Funding, and Proposition 13 Agricultural Water Conservation Program,

SUPPORTING DOCUMENTATION (References and Appendix A through Appendix E)

References lists the reports, studies, and other information sources consulted during development of the CMP. Additional technical support documentation is included in the Appendices, as follows:

- Appendix A: Projected Accounts
- Appendix B: Conservation Related Legislation
- Appendix C: IWA's Public Outreach Program Documentation
- Appendix D: Water System Audit Forms
- Appendix E: Emerging Technologies

1.0 INTRODUCTION

1.1 Purpose

The purpose of the Conservation Master Plan (CMP) is to identify opportunities for conservation within Indio Water Authority's (IWA's) service area, and to develop an approach and implementation schedule for those opportunities thereby reducing demands from all Customer Classes within IWA's service area with the goal of improving and sustaining IWA's long-term water resources. Programs that promote urban water conservation, both indoors and outdoors, can have a profound impact on the sustainability of water resources by reducing overall demand. Conservation reduces water demand through changes in consumer behavior and savings from water efficient fixtures. The CMP will consider the water demand for the next 20 years, existing water efficiency measures utilized by the City of Indio, the California Urban Water Conservation Council's (CUWCC) demand management measures (DMM), and other opportunities.

1.2 Background

The City of Indio, located in the arid desert Coachella Valley (Valley) in Southern California, has experienced substantial growth over the past decade and is expected to experience additional growth over the next 20 years. At present, IWA relies solely on local groundwater from an un-adjudicated basin that is showing signs of overdraft. As a result, IWA has been investigating opportunities to develop a more sustainable water supply that will allow for continued growth. In 2008, a Water Resources Development Plan (WRDP) was developed, providing a road map with an integrated approach to managing IWA's long-term water resources. The plan considered sustainable use of groundwater, surface water, recycled water, and water efficiency measures over the next 20 years, while still achieving IWA's long-term goals. These goals are elimination of the groundwater overdraft, maximization of conjunctive use opportunities, minimization of adverse economic impacts to Indio water users, and minimization of environmental impacts.

The 2008 WRDP strongly recommended that IWA consider implementing six different programs for improving the overall sustainability of IWA's water resources. These programs were:

- an Urban Water Conservation Program
- an Agricultural Water Conservation Program including in lieu canal water for groundwater
- a Recycled Water Program with Valley Sanitary District's
- a Surface Water Program to treat Colorado River Water from the Coachella Canal for potable supply
- a Groundwater Recharge Program
- a Supplemental Recycled Water Program utilizing remotely-located Membrane Bio Reactors (MBRs) to treat wastewater effluents for reuse

An Urban Water Conservation Program was the most highly rated of the six programs, providing a significant impact on water supplies, being readily implementable at the local level and requiring very low upfront capital costs. IWA moved quickly on these recommendations and authorized Black & Veatch (B&V) to develop their Urban Water Efficiency and Conservation Master Plan (Conservation Master Plan). This document will further define conservation opportunities and establishes a plan for implementation.

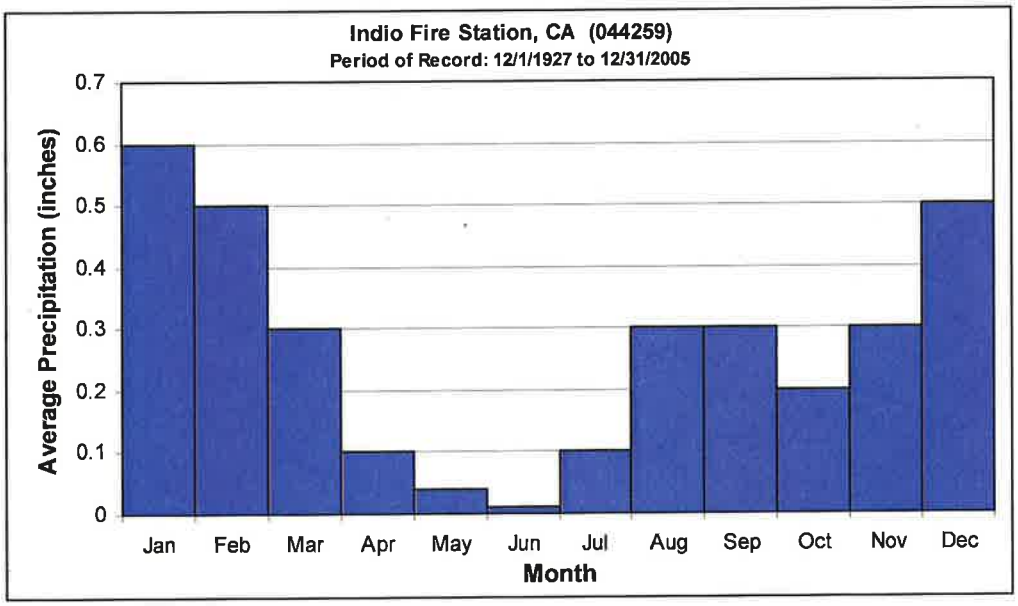
1.3 Climate

The climate of the lower Coachella Valley is arid and characterized by low annual rainfall, low humidity, high summer temperatures, abundant sunshine, and relatively mild winters. Precipitation typically occurs during the winter months with an annual mean rainfall of approximately 3.2 inches (in.).The average summer highs are 107 degrees Fahrenheit (F), and the average winter lows are 55 degrees F.

Table 1-1
Monthly Average Temperature Data for Indio (Location: Indio Fire Station, California. 044259 from 1927 to 2005.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Total Precipitation (in.)	0.6	0.5	0.3	0.1	0.04	0.01	0.1	0.3	0.3	0.2	0.3	0.5	3.2
Average Max. Temperature (F)	71	75	80	87	94	102	107	106	102	92	80	72	89
Average Min. Temperature (F)	39	44	50	57	65	72	78	77	70	60	46	39	58

Figure 1-1
Monthly Average Total Precipitation



1.4 Potential Effects of Global Warming

Climate plays a central role in the operation, planning, and management of water resource systems for water supply, flood management, and environmental stewardship. Expectations of precipitation; the timing, magnitude, and distribution of runoff; and the availability of water for beneficial use are based on our understanding of the climate system and experience with historic meteorological and hydrological events.

The potential impacts of climate change on water resources may be felt through changes in temperature, precipitation and runoff, and sea level rise (California Department of Water Resources [DWR], 2009).

A summary of some of the predicted climatic changes is provided below.

- Mean annual temperature increases from 2 to 6 degrees by 2100.
- An anticipated increase in extreme wet and dry conditions. It is unknown how annual precipitations totals may be impacted. More precipitation is predicted to fall as rain rather than snow in the middle elevations of the mountains.
- Decreased seasonal snowpack accumulation with earlier snowmelt particularly in the Northern Sierra Nevada Mountains (reduction by as much as 90% by 2100). By 2050, scientists project a loss of at least 25 percent of the Sierra snowpack.

- Less mountain block recharge from snowpack expected with possible implications for long-term support of regional aquifers.
- Annual runoff concentrated more in winter months with more variability and greater extremes.
- Sea level rise of up to 55 in. with the potential for higher rises if ice sheets collapse.
- Ecosystem challenges, such as forest fires, increased due to exacerbation of existing threats from above changes.

The implications of climate change regionally and nationally may adversely impact the following Valley water resources:

- State Water Project (SWP) entitlements – Reductions to the Sierra snowpack would reduce the availability of water during late spring and early summer and may make it more difficult to fill reservoirs, while increased sea levels would increase salinity intrusion, which could degrade available freshwater supplies. This would require the State to further reduce SWP entitlements, including allocations to the Valley.

- Colorado River Water (CRW) allocations – Reductions to snowpack in the Rockies could lead to less flow in the Colorado River, which would adversely affect transfers of CRW to the Valley. As a result of increased temperatures, greater demands throughout the Valley would be expected since plant evapotranspiration increases with increased temperature (DWR, 2005).

Computer models have been developed to show water planners how California water management might adapt to climate change. DWR has committed to continue to update and refine these models based on ongoing scientific data collection and to incorporate this information into future California Water Plans. As DWR develops more specific assessments of the potential effects of climate change on SWP and CRW delivery reliability, IWA should update their plans accordingly.

1.5 The Water Conservation Planning Process

In the development of the Conservation Master Plan (CMP), an important first step was to estimate future demands through population growth projections and current consumption patterns among all Customer Classes. Current demands were categorized under various classifications to better improve the understanding of water use within the service area to identify opportunities for demand reduction. Classifications include seasonal use, use by location throughout the service area, application (indoor or outdoor use), use by Customer Class (industrial, commercial, and residential), and purpose (recreational, consumptive, etc.).

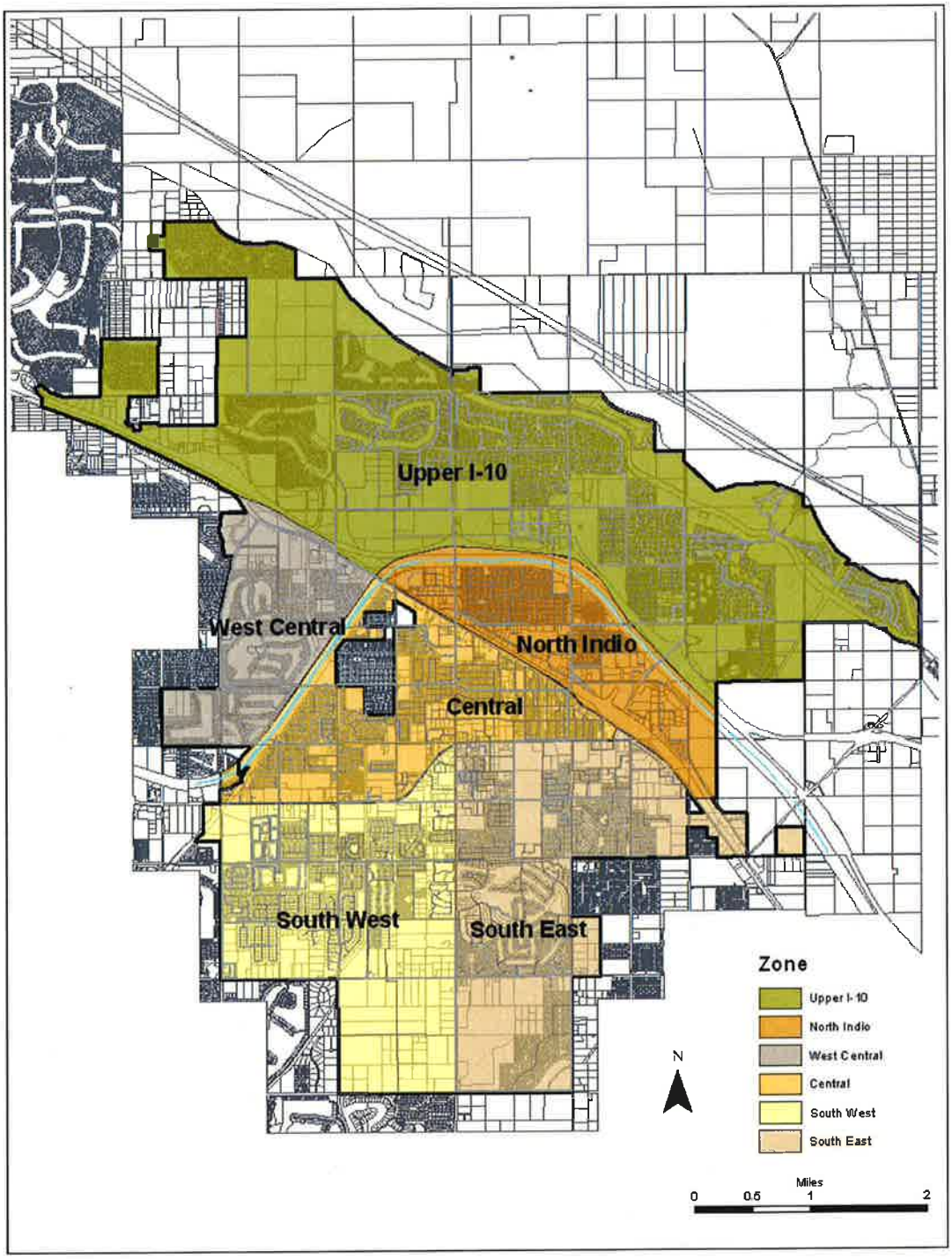
IWA has previously estimated that up to 60-percent of total demand from the single-family residential Customer Class may be for outdoor use (B&V, 2008b) and based on demand values by Customer Class presented in IWA's Water Master Plan (WMP) Update (Dudek, 2008), 30-

percent of the total water supplied by IWA to its entire service area is for outdoor use at single family residences. Thus the Conservation Master Plan focuses heavily on reducing outdoor water uses in the residential Customer Class.

A key element in producing the CMP was the development of an integrated water resources planning model, utilizing the Water Evaluation and Planning System (WEAP) software. The model was used to provide a comprehensive and flexible framework for policy analysis and provides a tool for IWA to measure and track the effectiveness of the elements of the CMP moving forward.

Determining water use by location throughout the service area allows IWA to target specific conservation programs to areas of greatest need. For this purpose, the service area was divided into 6 zones using physical barriers as boundaries (i.e., whitewater river, I-10 freeway, IWA service area boundary, and major streets). Each of these zones and its demands by Customer Class were modeled in WEAP. The zones are illustrated on Figure 1-2.

Figure 1-2
Zones Established for Analyzing Water Consumption in the City of Indio



1.6 Conservation Related Legislation

The State of California has been progressive in legislating water conservation policies and measures to encourage reduced dependence on potable water. These policies present state funding guidelines, compliance expectations, as well as directives for local agencies and urban water retailers which support conservation practices throughout the State of California. More in depth descriptions of each of the legislations are included in Appendix B.

Table 1-2
Relevant Water Conservation Legislation

Legislation*	Implementation Date	Entities Impacted	Description
AB 325	1993	Cities and Counties	Imposes irrigation and water use efficiency measures for landscapes greater than 2,500 square feet (sq ft).
AB 2717	2004	Cities, Counties and Urban Water Retailers	Sets up the Landscape Task Force to examine landscape water issues and formulate recommendations as to best practices and improvements.
AB 566	2010	Cities and Counties	Amends AB 325 by requiring that climate information based on the California Irrigation Management Information System (CIMIS) be used for irrigation scheduling statewide.
AB 715	2010	Manufacturers/ Retail	Sets performance standards for all toilets and urinals installed in the State of California. Sets 1.6 gallons per flush (gpf) toilets and 1 gpf urinals.
AB 1420	2008	Urban Water Retailers	Changes the funding eligibility requirements of Section 10631 of the Water Code (Urban Water Management Planning Act). Requires DMM implementation for grants or loans from DWR, the California State Water Resources Control Board (SWRCB) and the Bay-Delta Authority
AB 1560	2012	Energy Commission	Amends the Warren-Alquist State Energy Resources Conservation and Development Act and directs the California Energy Commission to adopt water efficiency or conservation standards that save energy for residential buildings.
AB 1881	2008	Energy Commission, Cities, Counties and Home Owner's Associations (HOAs)	Sets performance standards for irrigation equipment and prevents the prohibition of low water using plants.
AB 1061	2009	Local Agencies	Governing documents of a common interest development shall be void and unenforceable if it prohibits the use of low water using plants or if it has the effect of prohibiting or restricting compliance with local water-efficient landscape ordinance.
AB 2175	Proposed		Directs the State to reduce per capita urban water use 20 percent by 2020. The bill would accelerate water conservation efforts and decrease associated energy use and greenhouse gas (GHG) emissions.

* AB = Assembly Bill

Report Organization

Chapter 2 through 5 of this CMP are organized to follow the scope of work developed for the conservation portion of the WRDP.

- Chapter 2- develops the benefits of water conservation and the IWA's conservation goals.
- Chapter 3- describes IWA's current water supply sources, storage, distribution system and future supply planning efforts.
- Chapter 4- includes population forecasts, historic data analysis and classifications of water users, and development of a per capita water use.
- Chapter 5- provides current water efficiency measures of IWA's supply and distribution system, and on-going conservation programs.
- Chapter 6- includes the approach, development, data sources, and findings of the WEAP Model.
- Chapter 7- includes an evaluation of the CUWCC Best Management Practices (BMPs) and proposes conservation strategies for the five year implementation plan.
- Chapter 8- provides a five year implementation plan for the conservation strategies investigated, including schedule, budget and targets.
- References
- Appendices

2.0 CONSERVATION GOALS

This chapter discusses the benefits of water conservation and identifies IWA's water conservation planning goals.

2.1 Benefits of Water Conservation

Benefits of water conservation extend considerably beyond simply extending the availability of a current water supply. Reducing water demands through urban conservation efforts benefits all water users and potentially the environment. Additional benefits may include:

- Reduced energy consumption due to less pumping and treatment
- Reduced pollution and waste production due to less pumping and treatment
- Reduced Green House Gas (GHG) emissions
- Reduced groundwater overdraft
- Deferred new water resources development
- Reduced flows to wastewater treatment plants
- Reduced urban runoff due to over irrigation
- Economic savings – reduced capital and operating costs
- Reduced impact on the environment and increased environmental stewardship
- Reduced strain on the electric grid
- Drought Preparedness

In general terms, water used for consumption either by people or plants and animals can be referred to as irrecoverable water. Reducing the amount of irrecoverable flows through conservation has the added benefit of increasing the amount of developed water available for use, thereby deferring or even avoiding the costs associated with new water development, including transmission, treatment, storage, distribution, and disposal.

Reducing demands may also result in increased stream flows, more resilient groundwater supplies, and improvements to water quality.

Water use efficiency enables adaptation to increased dryness and mitigation of GHG emissions by reducing water and energy use. Water use efficiency can be considered a mitigation strategy for potential global warming due to the relationship between GHG emissions and the use of fossil fuels. Of the total energy used in the United States (DWR, 2009b), approximately 19 percent of all electricity, 30 percent of natural gas (non-power plant), and 88 million gallons of diesel fuel are associated with water conveyance, treatment, and distribution and with wastewater collection, treatment, and disposal.

2.1.1 Assessing the Financial Benefits of Water Use Efficiency

The financial benefits of any conservation measure can be assessed by comparing the cost of saving an acre-foot (AF) of water savings via the measure to the cost of acquiring an additional AF of supply. This approach acknowledges two methods for water agencies to meet water demands: increasing supplies and/or lowering demands. Communities benefit when water agencies use an integrated resource planning (IRP) approach to invest in the mix of supply- and demand-management strategies capable of meeting resource management objectives with the lowest overall cost and impacts.

2.1.2 Potential for Urban Water Conservation

Outdoor water use is a significant portion of total water use. For single family households in the arid west, outdoor irrigation accounts for 60 to 70 percent of household water consumption. The State of California's 20% reduction by 2020 (20x2020) Water Conservation Plan indicates that outdoor water use in the Colorado River Region, in which Indio lies, accounts for "almost 70 percent of demand." This appears to be consistent with seasonal demand patterns. Changing irrigation practices, landscape design, and use of some of the emerging technologies, such as new irrigation controller technologies, can reduce outdoor water consumption by 60 percent, thus reducing overall consumption by one-third.

The American Water Works Association Research Foundation (AWWARF) (1999a) has indicated that, with aggressive conservation and water efficient appliances, indoor residential water use could be reduced by up to 50 percent dependent upon current usage levels. Successful conservation programs have reduced indoor per capita water usage to as low as 46 gallons per day (gpd). As well, AWWARF has indicated that the potential water savings resulting from a conservation program in the commercial Customer Class ranges from 15- to 35-percent (AWWARF, 1999b).

2.2 IWA Water Conservation Goals

The purpose of the CMP is to establish a comprehensive long-term plan for reducing urban water demands within IWA's service area. The CMP will outline policies and programs that incorporate innovative emerging technologies and practices, as well as proven and cost-effective conservation measures.

IWA's goals for their urban conservation program are as follows.

- Mitigate groundwater overdraft by reducing overall demand.
- Reduce or defer the need for developing new water resources.
- Comply with State legislation.
- Achieve or surpass 20 percent reduction in potable water consumption by 2020.
- Implement the California Urban Water Conservation Council's (CUWCC) Demand Management Measures (DMMs).

3.0 CURRENT WATER SUPPLY SOURCES, PLANNING AND INFRASTRUCTURE

This chapter discusses water supply sources, the water production and distribution, and long-term water supply planning efforts.

3.1 Water Supply Sources

Groundwater from the Coachella Valley Groundwater Basin is the primary source of water supply for both urban development as well as agricultural uses in the Valley. Other supply sources include:

- Imported CRW including direct entitlements and waters exchanged for SWP water allocations
- Minimal surface water diverted from local streams
- Limited reuse water obtained from reclamation plants in the Valley

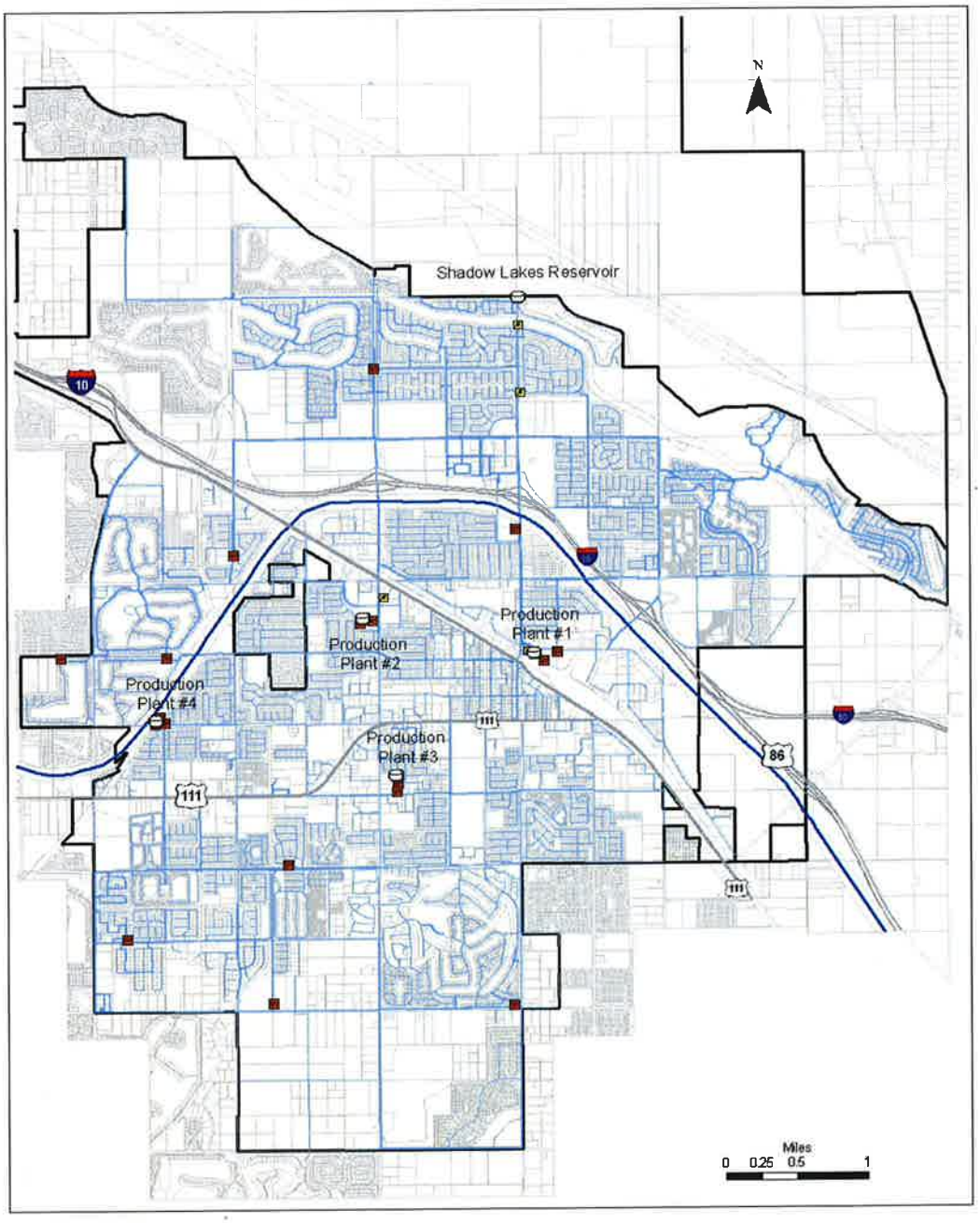
Currently, IWA relies entirely on groundwater from the regional groundwater basin to supply its urban demands. In 2005, IWA withdrew 20,817 AF (IWA, 2006), which represented approximately 5.4 percent of the total groundwater pumped in the Valley. The total water pumped annually from the aquifer exceeds natural recharge, and the aquifer is in an overdraft condition (B&V, 2008a).

3.2 Water Production and Distribution System

Figure 3-1 illustrates IWA's distribution system. IWA's potable water system has 18 active groundwater wells with a total maximum pumping capacity of 48,000 gallons per minute (gpm), or 69.1 million gallons per day (MGD).

All water is disinfected with sodium hypochlorite before entering the distribution system. Eleven of the 20 active wells discharge to storage reservoirs at one of four production plants. Each production plant includes a storage reservoir, booster pump station, chlorination equipment and surge tank to maintain system pressure. The remaining nine wells discharge directly into the distribution system. There are a total of five centrally located storage reservoirs in the distribution system with a total storage capacity of 18.2 million gallons (MG). Four of the five reservoirs are associated with the production plants. The fifth reservoir is supplied directly from the low pressure zone and serves as storage for one of the two high pressure zones. Since the reservoirs are not elevated, supply in storage must be pumped into the distribution system (Dudek, 2008). (This section needs to be updated from the information provided in the Dudek 2008 Master plan – conflicting edits provided by reviewers)

Figure 3-1
IWA's Water Production and Distribution System



LEGEND

- Storage Reservoir
- Active Well
- Inactive Well
- Whitewater River
- Distribution Mains
- Distribution Pipes
- Indio SOI
- Parcel

Figure 3.1
IWA Water Production & Distribution System

2009 Urban Water Efficiency and Conservation Master Plan

The existing water distribution system consists of a dominant low pressure zone, which supplies the majority of IWA's customers, two small high pressure zones that serve new developments along the northeast edge of the service area as well as new zone supported by an elevated storage tank.

3.3 Long-Term Water Supply Planning Efforts

In order to establish a more secure portfolio of water resources, it is highly desirable for suppliers to diversify their water resources to the extent possible. This diversification includes not only tapping into new resources, but also reusing resources and conserving existing available resources. As the City of Indio develops and grows, so will demands for potable water supply.

IWA's WRDP identified six alternatives to be implemented for the diversification of their water supply portfolio towards reaching their long-term planning goals. These alternatives are summarized in Table 3-1.

Table 3-1
Summary of the Evaluation of Preferred Alternatives

Option	Key Components	Potential Water Available
Urban Conservation	▸ Public outreach ▸ Water use ordinances ▸ BMPs	Savings of 9,500 to 17,300 acre-feet per year (AFY). Potential 26% reduction in total demand
Agricultural Conservation	▸ Conversion to water efficient irrigation systems ▸ Conversion to use of canal water ▸ Use of Salt Sniffer (See B&V, 2008b)	2,470 to 5,860 AFY, exclusive of Salt Sniffer program
Recycled Water from VSD WWTP	▸ Use of recycled water for irrigation and other lands ▸ Use of potential excess flows for groundwater recharge	6,600 to 18,000 AFY.
Treated Canal Water for Urban Use	▸ Development of agreement with Coachella Valley Water District (CVWD) for canal water ▸ Site, design, and construct a new water treatment plant	The amount will need to be determined after discussions with CVWD and will depend on plant size. The range evaluated is 5,600 to 16,800 AFY.
Recycled Water from Remote Recycling Plants	▸ Use of MBR and ultraviolet (UV) technology at localized sites as an alternative to centralized treatment at a WWTP ▸ Adoption of ordinance for dual systems in new developments	Water available ranges from 6,200 to 15,200 AFY. The range considers flow through ultimate build-out.
Groundwater Recharge by Spreading	▸ Use of recycled water from the VSD WWTP ▸ Development of recharge basins	The maximum amount available is 6,600 to 18,000 AFY. This amount will be reduced by the amount used for irrigation Canal water could also be used for recharge.

IWA is currently in the process of developing feasibility studies for the use of recycled water and also for the treatment of CRW from the Coachella Canal to reduce pumping of groundwater. A discussion of the status and latest planning information for implementation of each of these resources is presented below.

3.3.1 Surface Water

Approximately 20,000 AFY of new surface water supply is currently being acquired by IWA. This new supply is part of a 120,000 AFY supply made available within California' Sacramento-San Joaquin Delta (Delta). The water is a 1922 Appropriative right that will be ready for transfer in early 2010 and is being acquired on a long-term lease through 2035, with an option to extend. This new supply would reach IWA via existing SWP and CRW exchange agreements coordinated by CVWD and Metropolitan Water District of Southern California (MWD).

IWA is currently preparing a Conceptual Design Report for development of their surface water supply. The new Surface Water Treatment Plant (SWTP) would treat up to 20,000 AFY of CRW conveyed to the IWA service area via the Coachella Canal. Depending on IWA's actual demands, groundwater production, and recycled water use, this entire supply would be used locally, or a portion could be reserved for future storage and recovery program negotiations (i.e., providing a water source to outside agencies in exchange for developing a local storage account and financing capital facilities).

The new SWTP would provide a new surface water supply to IWA for potable use and groundwater recharge. The SWTP would be connected to IWA's existing and planned potable conveyance system and new injection wells for recharge. The new injection supply could serve as a blending source for potential, future recycled water injection. The new SWTP would likely be expanded in three phases, starting in the year 2015, with a capacity of approximately 8 MGD to serve both potable and recharge uses. Two further 4 MGD expansions in years 2025 and 2035 would bring the ultimate SWTP plant capacity to 16 MGD.

3.3.2 Recycled Water

IWA is currently working alongside Valley Sanitary District to upgrade their Waste Water Treatment Plan to provide a recycled water supply. Currently, there are no recycled water treatment and conveyance facilities in IWA's service area. Dual plumbing in new developments should be required by developers to streamline future recycled water use and integration. Existing VSD facilities consist of primary and secondary treatment facilities with discharge to the Whitewater River and neighboring wetlands and tribal lands. Development of a new recycled water supply would require the addition of tertiary treatment facilities, at a minimum, and potentially advanced treatment, depending on the type of use. Surface spreading requires tertiary treatment and injection of recycled water requires advanced treatment.

It is anticipated that the primary uses of recycled water would be for direct non-potable reuse and recharge. Direct non-potable reuse would include irrigation at golf courses and landscaping in

parks, on roadway medians and new home and commercial developments. Depending on the level of treatment provided, recharge would be either via surface spreading or injection.

IWA is currently planning a 4 MGD, first phase recycled water project. This project would include treatment facilities and core infrastructure, such as construction of a new recycled water pump station and major conveyance pipeline(s). The necessary environmental work has been initiated which in required prior to the commencing design of the proposed improvements. This initial phase is estimated to be online by 2015 with a potential future expansion in 2025 to 8 MGD, depending on future recycled demands and recharge requirements.

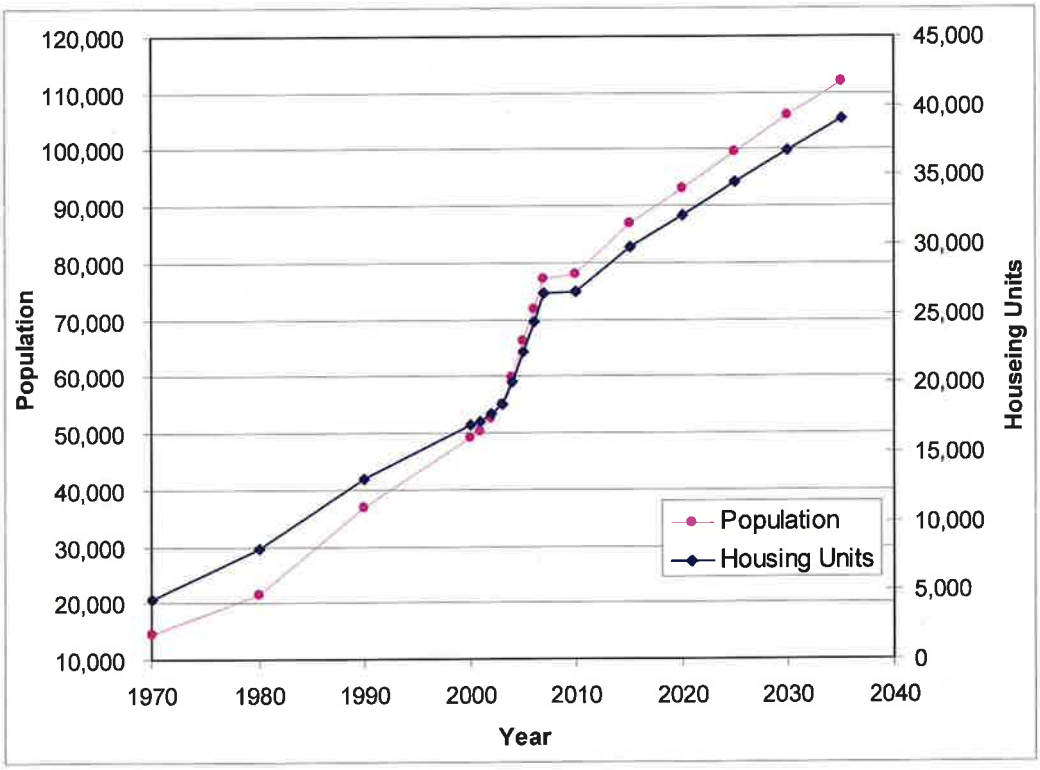
4.0 POPULATION FORECASTS AND CUSTOMER WATER USE

Topics described in this chapter include population forecasts and housing growth, historic water use, water use by season, and per capital water use. Profiles are provided of the largest water users (Customer Classes), and non-revenue water (NRW) is also discussed.

4.1 Indio Population Forecasts and Housing Growth

Like much of Southern California, the City of Indio experienced rapid growth in recent years until the economy slowed in 2008. Figure 4-1 presents historical population values and projections as developed by Riverside County's Center for Demographic Research (2008). Projections for housing units are also presented along the right axis.

Figure 4-1
Population Projections for the City of Indio (Riverside County, 2008)



Development has not occurred uniformly throughout the City of Indio. In recent years, development in some zones has exploded, while other zones have experienced very little growth. The sizes of homes and parcels are also reflective of the period in which they were built. Table 4-1 provides average home and parcel sizes for the six zones analyzed while Figure 4-2 displays the six zones and Figure 4-3 displays the proportionate amount of growth in single family homes occurring in the various zones since 1950.

Figure 4-2
Zones Established for Analyzing Water Consumption in the City of Indio

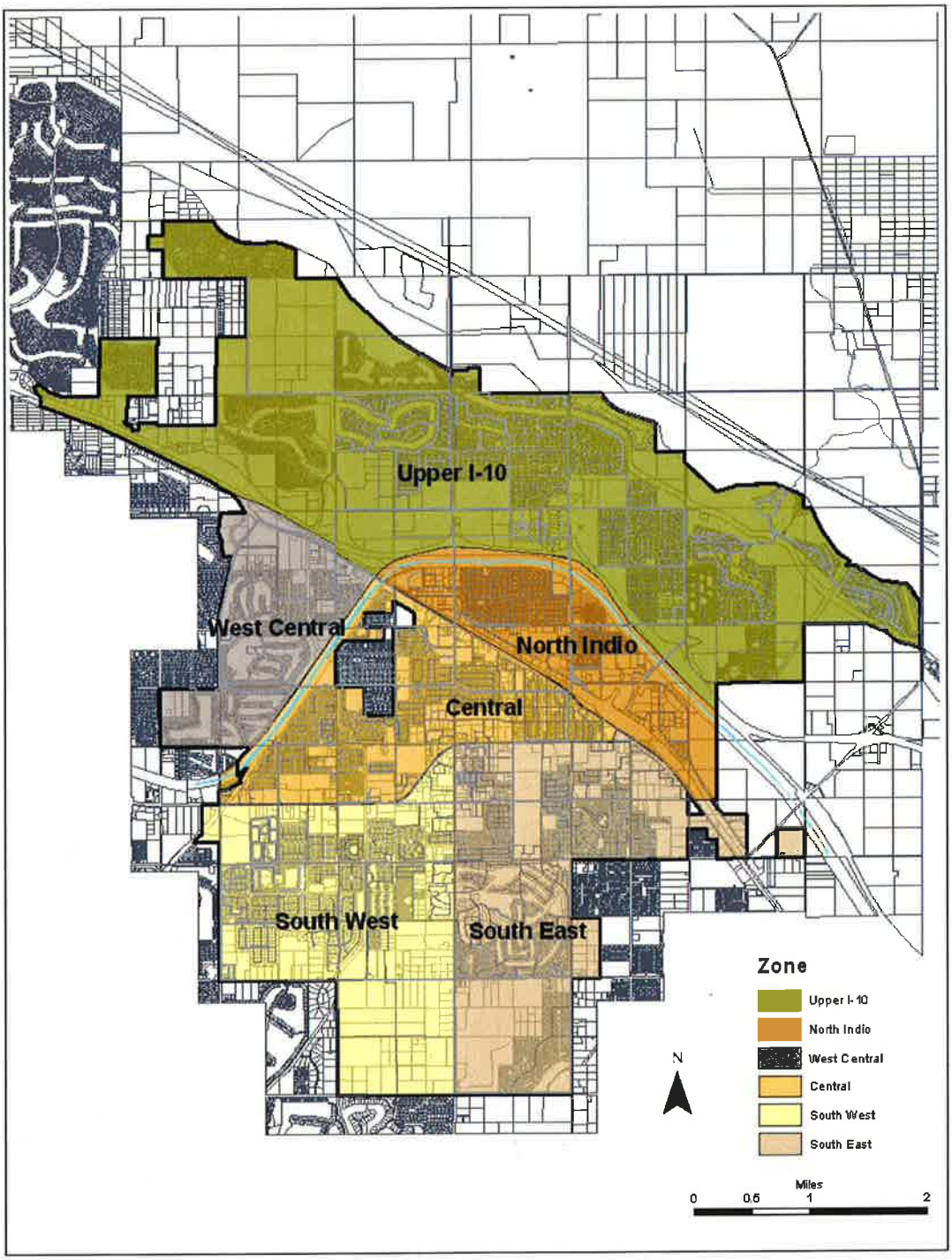
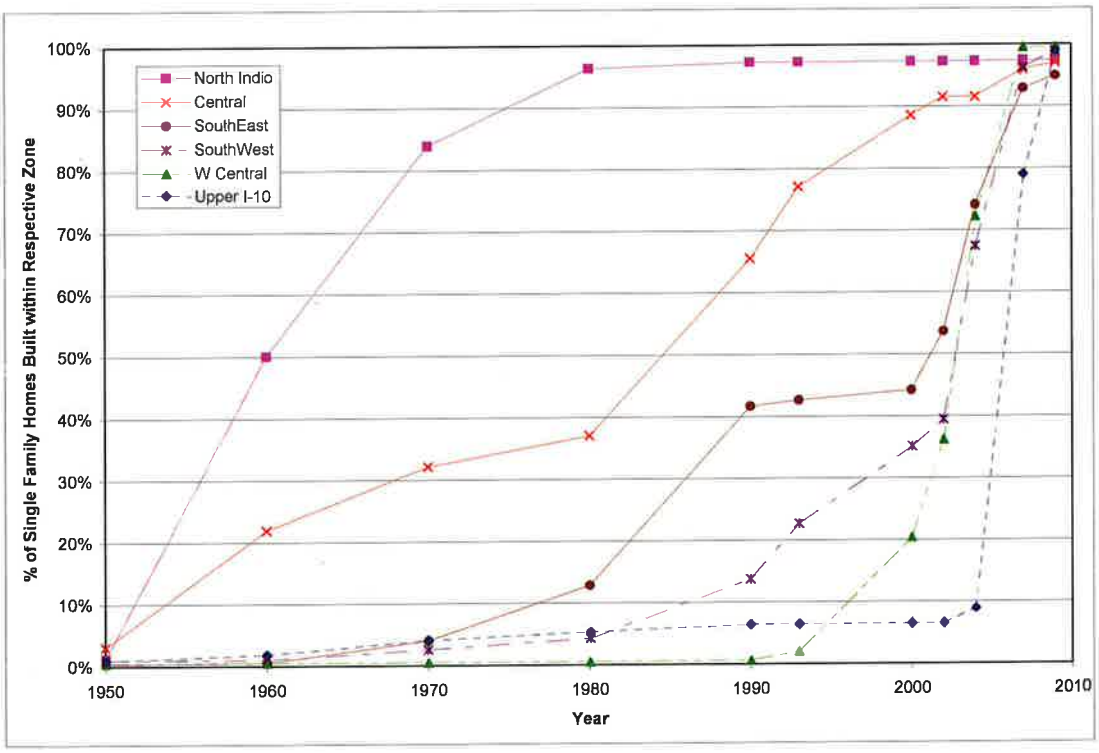


Table 4-1
Single Family Homes - Parcel Descriptions by Zone

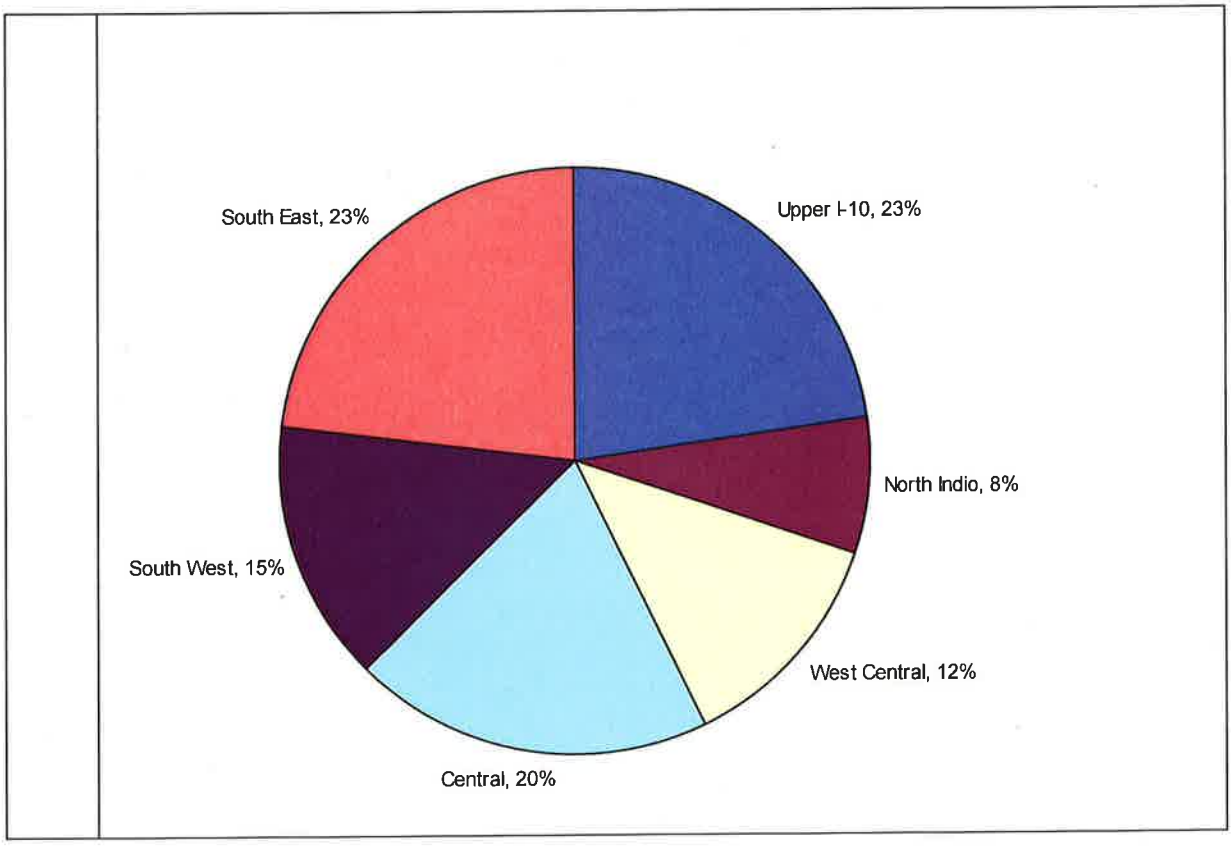
Zone	Average Parcel Size (sq ft)	Average Bldg Size (sq ft)	Ratio of Parcel to Bldg
N I-10	8,100	2,400	3.4
North Indio	10,100	1,400	7.2
West Central	7,400	2,200	3.4
Central	7,800	1,700	4.6
South West	10,300	2,300	4.5
South East	7,600	1,700	4.5

Figure 4-3
Construction Dates of Single Family Homes by Zone for the City of Indio



Based on the zone-parcel analyses, homes in the older zones of the City, North Indio and Central, are smaller than homes in the newly developed areas, Upper I-10 and West Central. However, the parcel to building ratio is higher in these older zones, indicating that the older regions have larger lots with more landscaped area which may indicate higher outdoor water use, providing a target for Indio's outdoor conservation efforts. Figure 4-4 presents the distribution of single family residential units based on 2008 consumption data.

Figure 4-4
Distribution of Single Family Residential Units as of 2008



4.2 Historic Water Use

As the City of Indio has grown and developed, so has demand for water. In 2002, consumption was approximately 16,900 AFY. By 2008, water consumption was over 22,000 AFY, all of which was supplied by groundwater.

Table 4-2 presents water use by Customer Class for 2002 through 2008. These values are based on metered billing data provided by IWA. Water consumption by Customer Class and by zone is illustrated on Figures 4-5 and 4-6.

Table 4-2
Consumption (AFY) by Customer Class for 2002 through 2008

Customer Class	2002	2003	2004	2005	2006	2007	2008
City Accounts (CITY)	530	520	560	590	760	710	980
Commercial (COMM)	2,520	2,780	2,770	2,640	2,610	2,470	1,940
Construction (CT)	800	1,620	1,460	840	430	490	430
Other (OTHER)	1,050	1,740	1,100	2,040	1,480	1,470	1,030
Irrigation (IR)	700	1,000	1,080	1,190	1,520	1,680	1,950
Multi-Family Residential (MF)	2,680	2,780	2,580	2,540	2,650	2,720	2,870
Single-Family Residential (SF)	8,630	9,700	10,330	10,980	13,130	13,780	12,970
TOTALS	16,900	20,150	19,880	20,820	22,590	23,320	22,160

Figure 4-5
Average Annual Water Consumption by Customer Class (2006 – 2008 data)

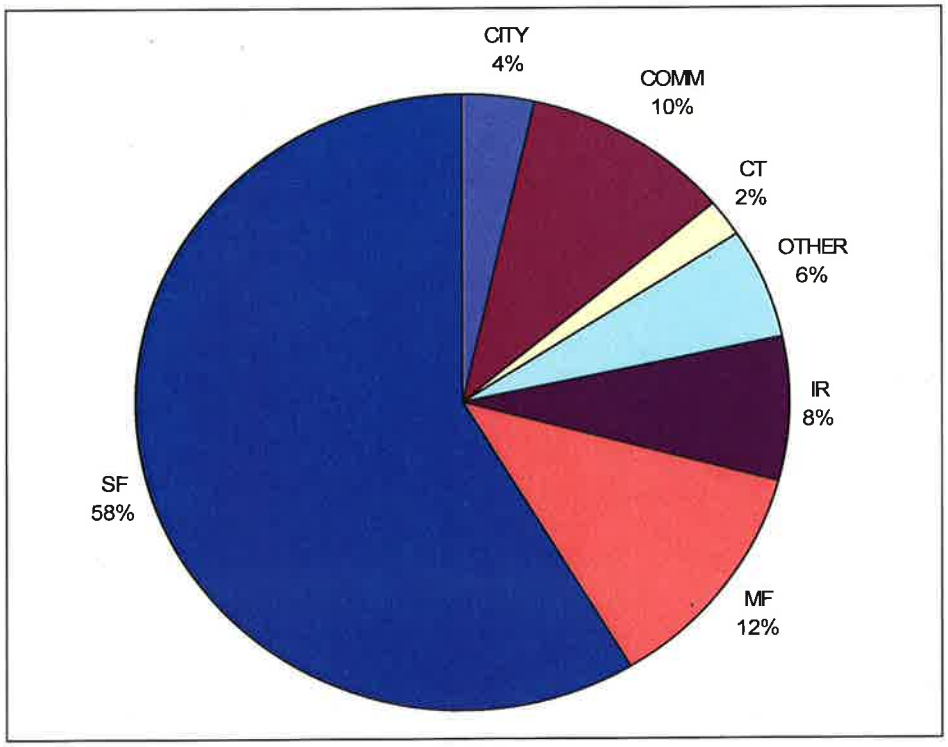
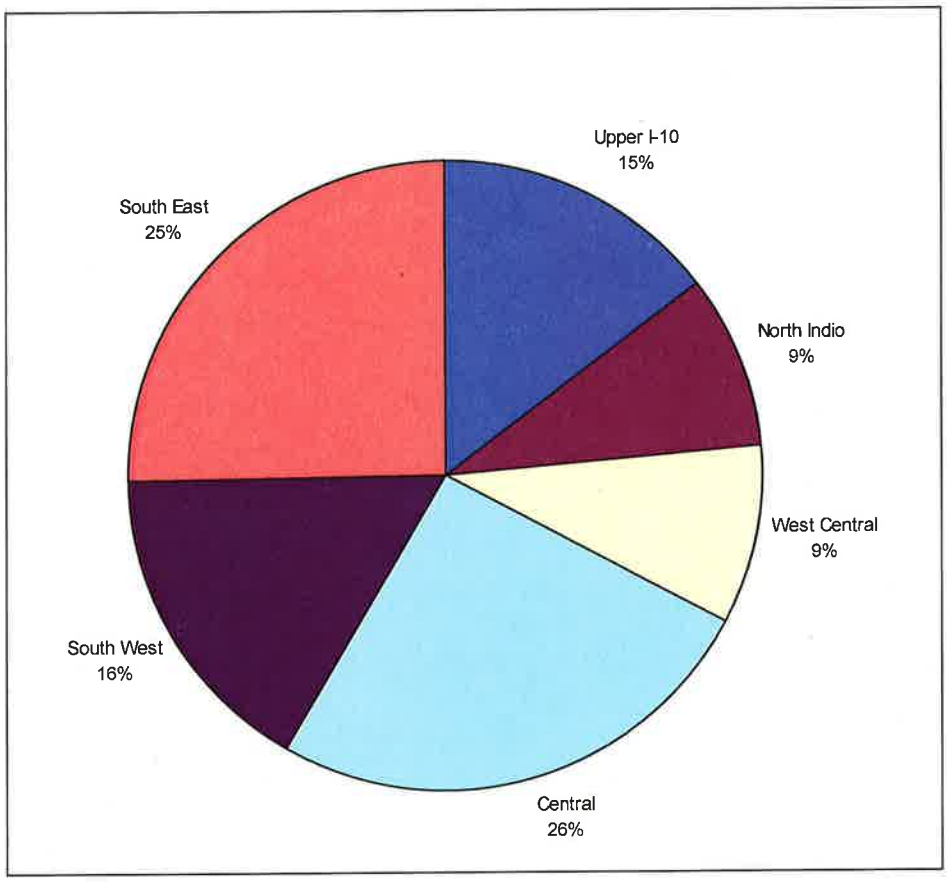


Figure 4-6
Annual Average Water Consumption by Zone (2006 – 2008 data)

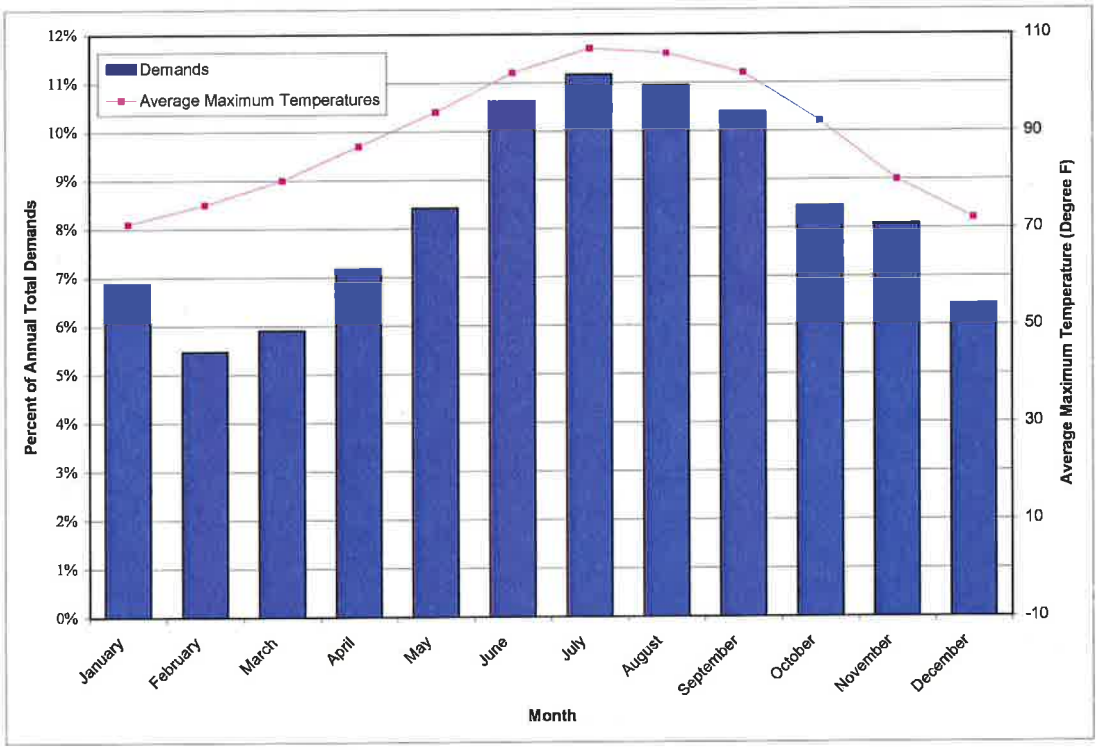


Single-family residential water consumption accounts for nearly 60 percent of total potable water demand within IWA's service area.

4.3 Water Use by Season

Water use tends to vary by season as a result of increasing irrigation demands with increasing temperatures. Figure 4-6 illustrates average monthly demands within IWA's service area as a percent of annual total demands.

Figure 4-6
Average Monthly Water Use

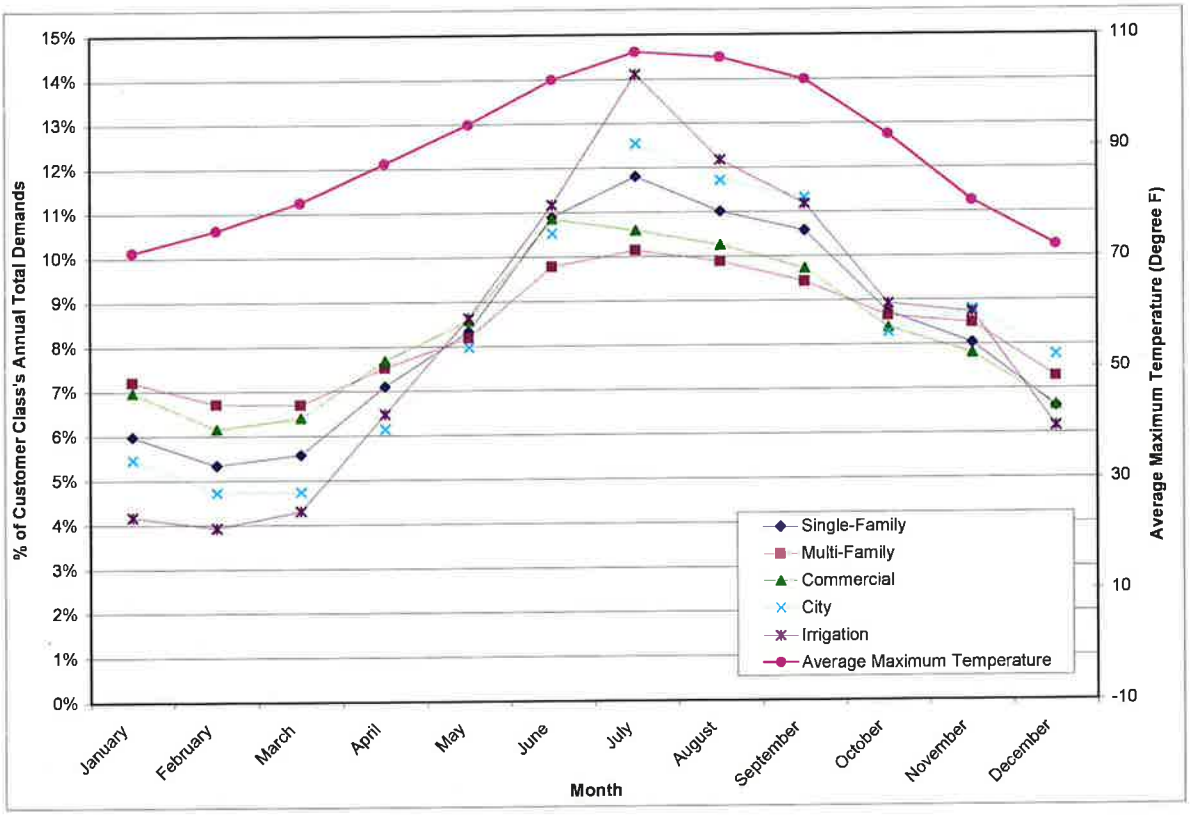


In the arid Valley, homeowners, businesses, and other facilities tend to continue to irrigate their landscapes throughout the winter months and in fact may not adjust automatic irrigation systems to account for reduced temperatures. Use within each of the Customer Classes tends to generally track along with rising temperatures.

In cities with much lower temperatures in winter months, outdoor irrigation ceases, and the indoor component of water usage is easier to identify. In the City of Indio, the indoor component is not easily extractable because of the mild winters and generally low precipitation year round. This dampened seasonal effect yields an overall higher percentage of water used for outdoor irrigation. Water for single-family residential outdoor uses is generally estimated to be approximately 60 percent of the total annual demand. However, in the arid region surrounding and including Indio, the percent of water for outdoor use is estimated to be 70 percent of total single-family residential consumption (SWRCB, 2009).

Figure 4-8 displays average monthly water use as a percentage of total annual use by Customer Class for the five largest water consuming Customer Classes (Single Family, Irrigation, Commercial, Multi Family, and City).

Figure 4-8
Average Monthly Water Use for Various Customer Classs



4.4 Per Capita Water Use

When comparing per capita water usage among cities, it is important to keep in mind that water utilities tend to employ different approaches for calculating the value. Some utilities present usage, gallons per capita per day (gpcd), as a function of total water consumption for all Customer Classes, while others present their gpcd as a function of either total residential water consumption or single-family residential usage. Table 4-3 presents IWA's gpcd water usage for all three approaches. Proving these values allows IWA to adjust their Daily per Capita Water Usage to accurately compare with other utilities regardless of their methodology. Table 4-4 presents a breakdown of residential water usage by indoor and outdoor usage based on findings by the SWRCB (2009) for the region.

Table 4-3
Daily per Capita Water Usage (gallons) for IWA's Service Area

GPCD	2002	2003	2004	2005	2006	2007	2008	Average
All Customer Classes	288	327	296	280	280	270	255	285
Residential Only	193	202	192	182	196	191	183	191
Single Family Residential Only	287	278	255	242	255	248	226	257

Table 4-4
Single-family Residential Water Usage (gallons) in IWA's Service Area*

Residential Water Usage (gpcd)	2002	2003	2004	2005	2006	2007	2008	Average
Indoor	86	83	77	73	77	74	68	77
Outdoor	201	195	178	169	178	174	158	180

*Based on SWRCB (2009) assumption that 70% of total water consumption is outdoor usage

One caveat that further blurs per capita water use rates for the City of Indio is the fact that several of their residents are seasonal and as such may not be counted in the county's population estimates. Effectively, this causes IWA's estimated daily per capita use rates to be higher than they actually are.

It appears that per capita usage has been steadily declining over the past six years. This is likely a combination of changes in water use behaviors by residents and the construction of new, larger homes on relatively smaller lots that have water efficient fixtures installed.

Table 4-5 presents IWA's household water usage based on residential water consumption. Estimates for the average numbers of persons living within each housing unit are also presented. These values were calculated directly from the population and housing unit values presented in Riverside County's 2007 Progress Report (Riverside County, 2008).

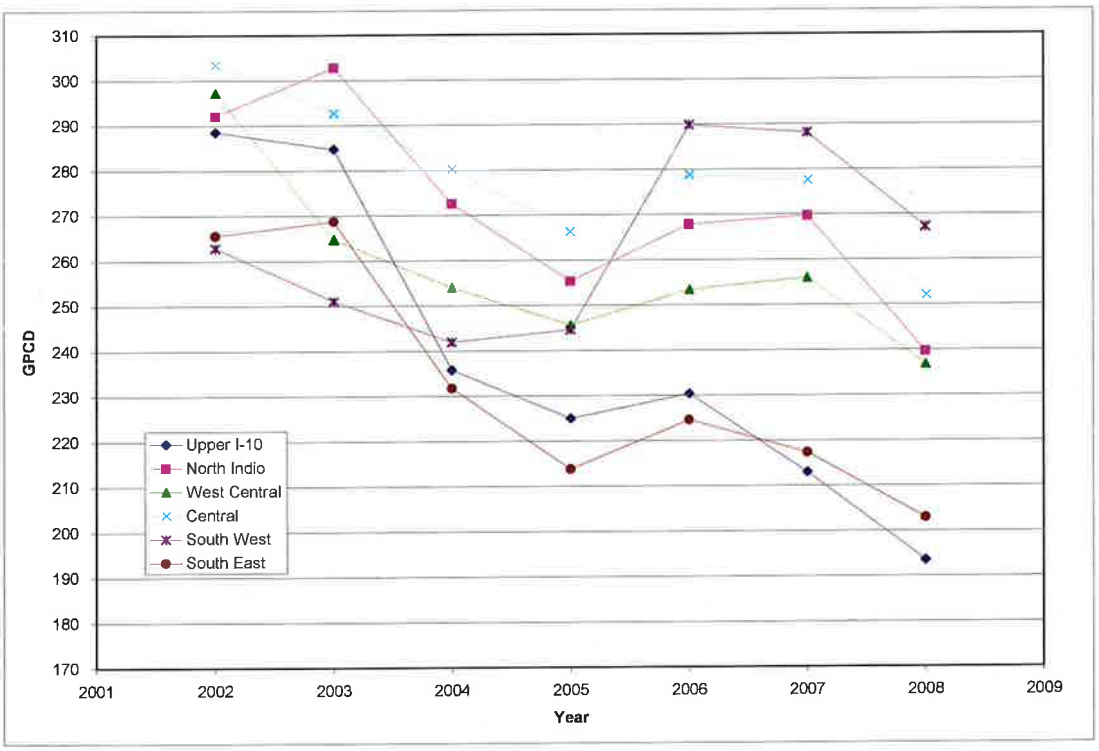
Table 4-5
Daily Household Water Usage (gallons) for IWA's Service Area

Gallons/Household/Day	2002	2003	2004	2005	2006	2007	2008	Average
Household Usage Rate[1]	569	603	574	542	579	557	-	571
Average # Persons per Household[1]	2.95	2.98	2.99	2.98	2.96	2.92		2.96

[1] Riverside County, 2008. Housing Units

Water usage will tend to vary geographically throughout IWA's service area. Usage is dependent upon the types of water users within each of the zones and the age of facilities within zones. Figure 4-8 illustrates how per capita water usage within the single-family residential Customer Class varies by zone. The values in Figure 4-8 were estimated by assuming 2.96 persons per household.

Figure 4-9
Per Capita Single-family Water Usage by Zone



It can be seen that average per capita water use in the Upper I-10 and South East Zones has declined over the years due to the construction of new housing developments with larger homes on relatively smaller lots and water efficient fixtures installed. The South West Zone has also experienced much growth in recent years, but the homes in this zone tend to be larger and on much larger lots, resulting in higher single-family per capita water usage.

4.5 Largest Water Users' Profiles

An analysis was performed of the ten largest water users within each of the seven Customer Classes (City, commercial, construction, irrigation, single Family residential, multi-family residential, and others). Results show that the cumulative demand of these 70 accounts is nearly 15 percent of IWA's annual demands (Table 4-6).

Table 4-6
Summary of Analysis of the Ten Largest Water Users within Seven Customer Classs

Option	Description of 10 Largest Accounts	Approximate water use per customer class	Water use per IWA's total demands for 2008
City Customer Class	City parks and sports facilities or golf courses	50 percent	2 percent
Commercial Customer Class	Hospitals, casinos, hotels/motels, laundry facilities, and others	17 percent	1.5 percent
Construction Customer Class	Construction projects	65 percent	1.2 percent
Irrigation Customer Class	Schools, home owners associations (HOAs), private golf courses, and country clubs	18 percent	1.5 percent
Single-family Residential Customer Class	Average parcel size of homes is 58,540 square feet (sq ft), nearly all of them located in the South West Zone	1percent	0.4 percent
Multi-family Residential Customer Class	Recreational vehicle (RV) parks and large apartment complexes, predominantly located in the Central and South East Zones	29 percent	3.8 percent
Other Users Customer Class	Public schools	51 percent	2.4 percent

4.5.1 City Customer Class

The ten largest accounts within the city Customer Class accounted for approximately 50 percent of this Customer Class's total consumption and 2 percent of IWA's total demands in 2008. All of these accounts are for either city parks and sports facilities or golf courses.

4.5.2 Commercial Customer Class

The ten largest accounts within the commercial Customer Class accounted for approximately 17 percent of this Customer Class's total consumption and 1.5 percent of IWA's total demands in 2008. These commercial users include hospitals, casinos, hotels/motels, laundry facilities, and others.

4.5.3 Construction Customer Class

The ten largest accounts within the construction Customer Class accounted for approximately 65 percent of this Customer Class's total consumption and 1.2 percent of IWA's total demands in 2008.

4.5.4 Irrigation Customer Class

The ten largest accounts within the irrigation Customer Class accounted for approximately 18 percent of this Customer Class's total consumption and 1.5 percent of IWA's total demands in 2008. These irrigation users include schools, home owners associations (HOAs), private golf courses, and country clubs.

4.5.5 Other Users Customer Class

The other users Customer Class combines meters located outside the IWA service boundary and government buildings. The ten largest accounts within the other users Customer Class accounted for approximately 51 percent of this Customer Class's total consumption and 2.4 percent of IWA's total demands in 2008. These users include public schools.

4.5.6 Multi-Family Residential Customer Class

The ten largest accounts within the multi-family residential Customer Class accounted for approximately 29 percent of this Customer Class's total consumption and 3.8 percent of IWA's total demands in 2008. These users are recreation vehicle (RV) parks and large apartment complexes and are predominately located in the Central and South East Zones.

4.5.7 Single-Family Residential Customer Class

The ten largest accounts within the single-family residential Customer Class accounted for approximately 1 percent of this Customer Class's total consumption and 0.4 percent of IWA's total demands in 2008. The average parcel size of these homes is 58,540 sq ft (1.3 acre), and nearly all of them are located in the South West Zone.

4.6 Non-Revenue Water

In all distribution systems, differences exist between the amounts of water produced (pumped) or treated and the amount actually consumed, which is based on metered/billing records. These differences may be referred to as "non-revenue waters" or as "system water losses." Some revenue losses may be attributed to leaks in the distribution system (real losses), but more often they are a result of un-metered connections, meter inaccuracies, maintenance operations, storage overflows, street cleanings and/or fire flows. The latter types of NRW are termed apparent losses. According to the American Water Works Association (AWWA), apparent losses refers to paper losses that occur in utility operations due to customer meter inaccuracies, billing system data errors and unauthorized consumption. In other words, this is water that is consumed but is not properly measured, accounted or paid for (AWWA, 2009). Water suppliers should make every effort to reliably and regularly audit their supplies such that no water is "un-accounted for."

Previous studies have estimated IWA's NRW to be from 5.3 to 7.5 percent (B&V, 2008a and Dudek, 2008, respectively) which is much lower than the 10% goal of the California Urban Water Conservation Council. IWA has initiated a program to replace old meters in order to

reduce any discrepancies which may result from worn water meters. IWA may also want to consider a leak-detection program to further reduce NRW occurring in the system.

5.0 CURRENT WATER EFFICIENCY/CONSERVATION PROGRAMS

This chapter presents an overview of IWA's Conservation Program and describes several of the ongoing programs in more detail: system water audits, customer metering, landscape programs, Water Smart Education and Outreach Program, and conservation staffing.

5.1 Overview of the Current Conservation Program and Existing Ordinances

IWA's Conservation Program was initiated in 2008. In developing their water conservation program, IWA utilized many of the California Urban Water Conservation Council's (CUWCC) Demand Management Measures (DMMs) as guidelines. In total, the CUWCC has 14 DMMs to address and promote water efficiency and conservation statewide. The DMMs proposed by the CUWCC are presented in Table 5-1 with IWA's implementation status indicated.

Table 5-1
CUWCC DMMs and Implementation Status

No.	DMM	Status
1	Residential Surveys	Implemented
2	Residential Retrofits	Upgrades to irrigation systems implemented. Internal plumbing fixtures under evaluation.
3	System Water Audits	IWA's System Water Audit Program was started in 2001. The goal is to maintain < 2% water loss in the distribution system.
4	Metering	Implemented - 100% of IWA's customers are metered, and any new water users will require metering on their service connections. IWA will require separate meters for irrigation on all commercial, industrial, and apartment building properties by January 1, 2013.
5	Landscape	Implemented - Since 2008, IWA has taken several steps: ▸ Landscape and Water Conservation Ordinance ▸ Smart Controller Program ▸ Water Smart Landscape Rebate Program
6	Clothes Washers	Under Evaluation
7	Public Information	Implemented - IWA's Water Smart Education and Outreach Program was started in 2006 and has since expanded to include: ▸ Cooperative efforts with the Coachella Valley Association of Governments (CVAG) ▸ Memorandum of Understanding (MOU) with Valley water agencies ▸ Active membership in Water Agencies of the Desert Region (WADR)
8	School Education	Implemented as part of the Public Information Program.
9	Commercial, Industrial, and Institutional (CII)	Under Evaluation
10	Wholesale Incentives	Not Applicable
11	Rates	Under development to be implemented in May 2010
12	Conservation Coordinator	Implemented - IWA hired an Environmental Programs Coordinator hired in 2006 to facilitate conservation efforts and conservation programs.
13	Waste Prohibitions	Implemented
14	Residential Ultra-low Flow Toilet (ULFT) Replacement Programs	Under Evaluation

Thus far, IWA's conservation program has culminated in a Large Landscaping and Water Conservation Ordinance as well as a Water Wasting Ordinance.

Implementation of the DMMs will allow IWA to continue to work towards achieving their conservation goals as well as comply with the Urban Water Management Plan guidelines developed the California Department of Water Resources. The CUWCC also administers the Memorandum of Understanding (MOU), which is a formalized agreement between CUWCC and water agencies to implement economically-feasible BMPs. IWA became a signatory of the

CUWCC conservation program in 2009. CUWCC is responsible for monitoring the list of DMMs for updates and changes as new conservation practices are implemented.

Based on the water conservation measures presented in Table 5-1, IWA has not formally recommended a tiered rate structure to their Board, but is in the process of developing one to be presented in May of 2010. Other utilities have successfully altered consumer behavior by introducing tiered rate structures. Irvine Ranch Water District (IRWD) in Orange County found that a tiered rate billing system, based on a water budget allocation, encouraged conservation and discouraged substandard irrigation systems (IRWD, 2007). The Coachella Valley Water District implemented a tiered rate structure in 2009. Rate structures are based upon the premise of providing customers with the water that they need at the lowest rates, while penalizing inefficient use with higher rates.

The following sections describe further the programs implemented under IWA's Conservation Program. IWA will implement additional water efficiency programs if they are to achieve their water conservation goals and as well any goals mandated by the State of California.

5.2 System Water Audits

IWA's System Water Audit Program began in 2001 with the last annual audit was completed in 2008. Monthly audits are also performed.

Records were not kept for leak and/or line break repairs performed by IWA from 2001 through 2005. As well, there are no records for official auditing, such as estimates for the miles of mains surveyed, miles of lines repaired, actual expenditures, and actual water savings resulting from the System Water Audits Program from 2001 through 2005. In 2006, IWA expanded their record-keeping associated with leak detection activities with data including:

- Incident description
- Number of leaks repaired last year
- Annual leak repair cost
- Water leak size

IWA's goal is to maintain less than a two percent annual water loss in the distribution system. This goal is measured by reviewing monthly and annual water consumption and production data currently being tracked. Expansion of this program will enhance IWA's knowledge and awareness of their system, which would allow for more accurate targeting of problem areas for future maintenance or replacement. Areas of expansion currently in effect are:

- IWA has changed the way it tests for fire flow compliance, utilizing hydraulic modeling software to predict the available fire flow without using any water.
- IWA has had its own inspector since mid 2007 to monitor water use at construction sites and ensure that all flows are being monitored.

- IWA has acquired an electronic leak-detection device as a first step in implementing a leak detection/prevention program.

5.3 Customer Metering

One hundred percent of IWA's customers are metered, and any new water users will require metering on their service connection. Individual metering of accounts is an important component towards altering consumer behaviors as it creates accountability for water use. IWA will require separate meters for irrigation on all commercial, industrial and apartment building properties by January 1, 2013.

Illegal hydrant connections have increased significantly over the past few years, as a result of the enlarging service area. Such illegal connections reduce revenues and increase unaccounted for water. Diligence by field staff with the assistance of Code Enforcement is helping to reduce the illegal connections. To further reduce such connections, IWA has initiated a private hydrant lock-out program.

Past history in the water industry shows that water meters slow down as they become old and worn, resulting in loss of revenue for the water agency and increasing unaccounted for water. At the end of 2006, IWA had approximately 18,600 connections, each with individual meters. Approximately 8,060 of these were 12 to 27 years old. A meter 10 years and older could register 4 to 20 percent less than the actual water usage. The older the meter, the less accurate it becomes, increasing the un-accounted for water supplied by the utility.

In 2006, IWA initiated a 5 year program to replace all meters installed prior to 2006. The oldest meters were given the highest priority for replacement. IWA's meter replacement program consists of two phases. Phase One work involves the replacement of all existing direct-read water meters installed prior to 2006 with the newer Neptune T-10 models, which incorporate a wireless automated meter reading system. Once implemented, Phase Two will be the on-going process of systematically replacing meters in those areas with the highest probability for failure.

5.4 Water Conservation Landscape Programs

Since 2008, IWA has taken several steps to establish a landscape conservation program, generally promote conservation outdoors, and reduce water waste.

5.4.1 Landscape and Water Conservation Ordinance (No. 1528 §54.054)

IWA's Landscape and Water Conservation Ordinance, adopted in March 2008 and amended in December 2009, addresses several issues relative outdoor water use. Some of the guidelines are:

- Prohibits outdoor water waste that leads to water flows onto roadways.
- Prohibits community covenants, conditions, and restrictions in new developments that would prohibit low water use landscaping or require water-intensive landscaping.

- Requires certain landscaping equipment for irrigation systems.
- Identifies potential administrative remedies to enforce ordinance.

5.4.2 Smart Controller Program

This program offers rebates to customers for replacing standard landscape controllers with new smart controllers. The new controllers are able to calculate irrigation needs as a function of the type of landscaping and changes in weather and soil conditions.

5.4.3 Water Smart Landscape Rebate Program

IWA has started a Water Smart Landscaping Rebate Program to assist residents, business owners, and developers in replacing water intensive landscaping with low water usage plants and desert landscapes. The program offers rebates of $1.00 per sq ft of turf removed, up to $750 per residence and $1500 per commercial property.

Specifically, IWA audits the irrigation system and gives information on how the property might conserve water with the existing landscaping without complete turf removal. Options include changing to drip irrigators where possible, grouping plants on different valves, and replacing old sprinkler heads with new pressure reducing adjustable heads. When the water audit is done, guidelines are reviewed and forms for turf removal completed. The auditor measures areas that the customer is interested in removing and that qualify and then takes pictures to record existing conditions. The customer needs to submit the completed application and some design plans to be approved before the work starts. Once the plans are received and reviewed, IWA contacts the customer to begin work. When the work is done, the customer contacts IWA to verify that the project has been implemented, takes pictures, and submits an invoice.

5.5 Water Smart Education and Outreach Program

IWA's public information program, Water Smart Education and Outreach Program, was started in 2006 and has since expanded to include outreach to schools. Public education has been expanded over the last couple of years to cover all of IWA's and the City's environmental programs. As a part of IWA's cooperative efforts with the Coachella Valley Association of Governments (CVAG), the Landscape and Water Conservation Ordinance requires that all landscapers doing business in the City attend workshops on landscaping, endorsed by CVAG, and water conservation. IWA intends to hold workshops for professional landscape architects and gardeners.

IWA is currently working with the other water agencies in the Valley to develop a partnered outreach program that will be beneficial to all Valley water agencies. It will benefit all agencies with cost sharing and outreach messages that will be uniform throughout the Valley. In September 2008, IWA signed a MOU along with other Valley water agencies pledging to devote resources to develop an integrated regional water management plan with respect to water supply and water quality.

IWA is also an active member of Water Agencies of the Desert Region (WADR), a group of Valley water agencies working together to send a unified message about water conservation.

5.6 Conservation Staffing

In 2006, IWA hired an Environmental Programs Coordinator to facilitate their conservation efforts. The coordinator oversees not only water conservation but also other environmental programs. Currently, three additional staff support the Environmental Programs Coordinator.

6.0 WATER EVALUATION AND PLANNING SYSTEM

This chapter describes the WEAP model and development of the model for the IWA service area. Three potential scenarios are developed for conservation programs; baseline, moderate, and aggressive.

6.1 The WEAP Model Approach

WEAP is a microcomputer tool for integrated water resources planning. It can be used in several ways: used as a database for maintaining demand and supply information; as a forecasting tool to simulate demands, supply, runoff, stream flows, storage, pollution generation, treatment and discharge; and as a policy analysis tool to evaluate a full range of water development and management options that considers multiple and competing uses of water systems. Operating on the basic principle of water balance accounting, WEAP is applicable to both municipal and agricultural systems. The software can address a wide range of issues including Customer Class demand analyses, water conservation, water rights and allocation priorities rainfall/runoff and baseflow, groundwater and streamflow simulations, reservoir operations, hydropower generation, water quality, ecosystem requirements, and project benefit-cost analyses.

6.2 Data Sources

Meter data provided by IWA was the primary data source for model development. This data included monthly consumption for all metered accounts from June 2001 through June 2009. Since the WEAP model requires complete annual information, data from 2001 and 2009 was not included in the WEAP modeling efforts.

Each entry of IWA's metered data contained a rate code identifier, which aided in sorting accounts by Customer Class. Table 6-1 presents the rate identifiers encountered and their classification for the WEAP model.

Table 6-1
Classification of Accounts by Customer Class for WEAP Model Development

Rate Code	Description	WEAP Model Classification
A	Apartments	Multi-Family Residential
AP	Apartments	Multi-Family Residential
C	Commercial	Commercial
CA	City Accounts	City
CI	City Irrigation	City
CP	City Parks	City
CT	Construction	Construction
CU	Commercial with Units	Commercial
DH	Double Rate Hotel/Motel	Commercial
DR	Double Rate	Other
GV	Government	Government
HM	Hotel/Motel	Commercial
IR	Irrigation	Irrigation
LL	Landscape & Lighting	City
MH	Mobile Homes	Multi-Family Residential
R	Single Family Residential	Single-Family Residential
R+	SF Residential +55	Single-Family Residential
RV	RV Parks	Multi-Family Residential

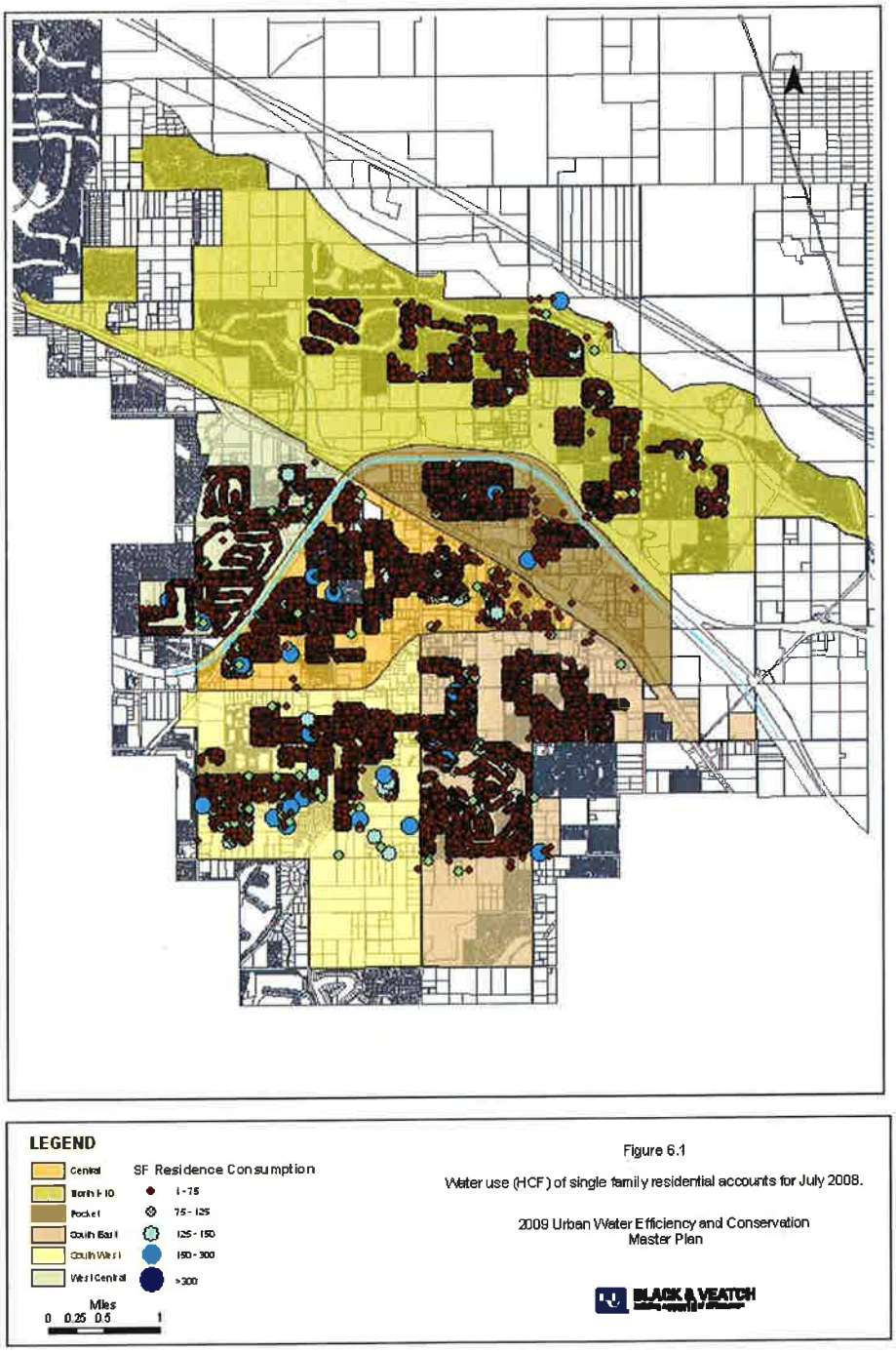
The provided metered data was linked to tables containing addresses, parcel and building descriptions and customer information. Geographic information system (GIS) data for all meters was also provided enabling each account to be spatially located and segregated into zones. Figure 6-1 illustrates the spatial location of single family accounts. Peak month water use in hundred cubic feet (HCF) for each account is also represented.

6.3 Model Development

6.3.1 Overview

Model development in WEAP includes several steps. The first step is the study definition which establishes the time frame, spatial boundary, system components and configures the problem. A snapshot of the current situation is set-up next, which considers actual water demand, pollution loads (if considered), resources and supplies for the system. Alternative sets of future assumptions are based on policies, costs and factors that affect demand, pollution, supply and hydrology. Scenarios are constructed consisting of alternative sets of assumptions or policies. Finally, the scenarios are evaluated with regard to water sufficiency, costs and benefits, compatibility with environmental targets, and sensitivity to uncertainty in key variables.

Figure 6-1
Water Use of Single Family Residential Accounts for July 2008 (HCF)



6.3.2 Development of WEAP Model for IWA Service Area

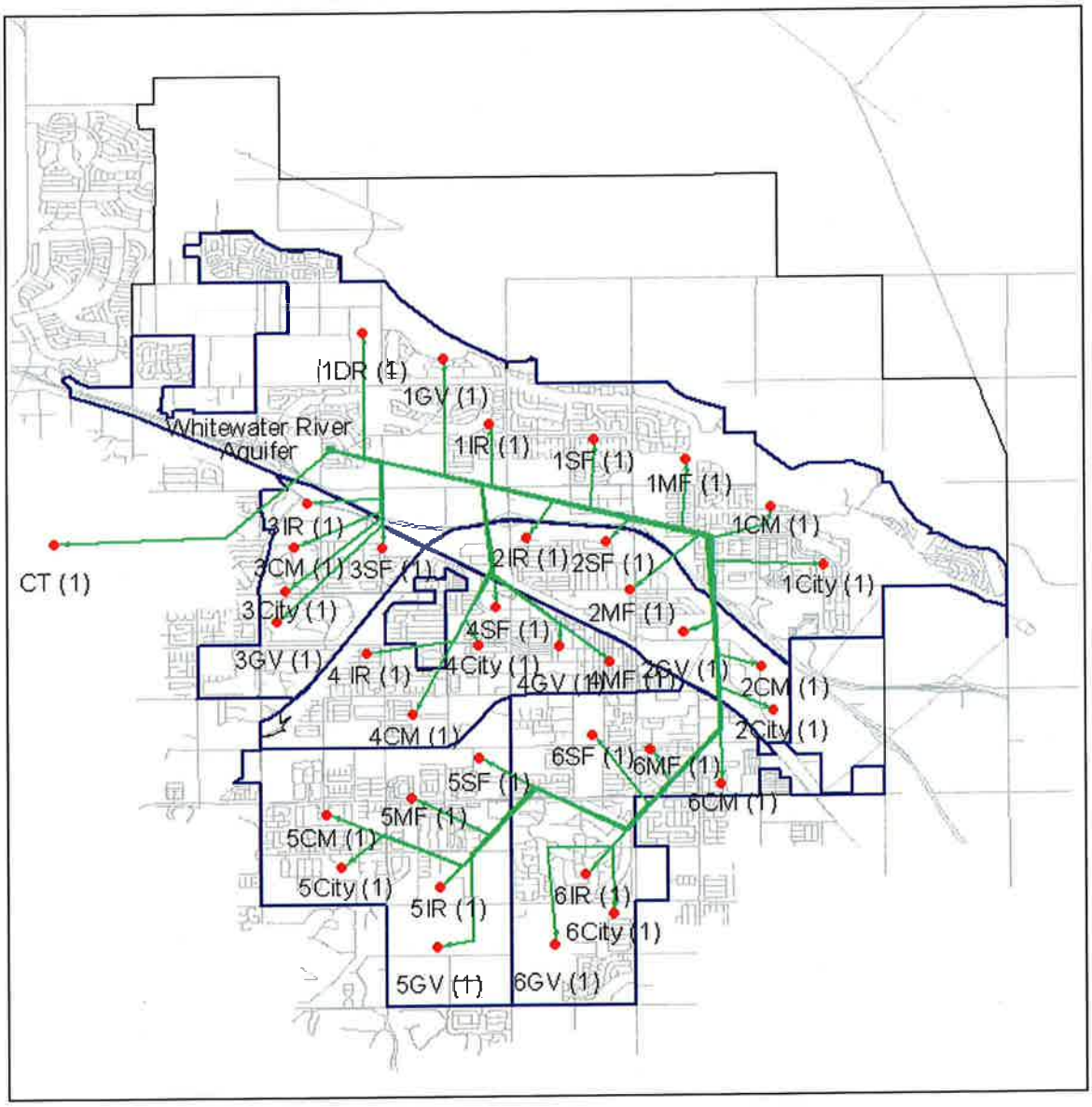
The model of IWA's service area was set up as a series of demand nodes within each of the six defined zones. All of the demand nodes were supplied from a single supply node, representing the groundwater aquifer. Based on the metered data provided, not all zones contained demand nodes for all Customer Classs. Table 6-2 presents the demand nodes associated with each of the zones and Figure 6-2 illustrates the WEAP model's representation of the IWA system.

Table 6-2
Demand Nodes Modeled in WEAP for Each Zone

	Upper I-10	North Indio	West Central	Central	South West	South East
Single-Family Residential	X	X	X	X	X	X
Multi-Family Residential	X	X		X	X	X
Commercial	X	X	X	X	X	X
City	X	X	X	X	X	X
Irrigation	X	X		X	X	X
Government	X	X	X	X	X	X
Construction		X				
Other*	X					

* Categorized as Double Rate under rate information

Figure 6-2
WEAP Model Representation of IWA's System



6.4 Assumptions and Planning Criteria

6.4.1 Growth Projections

Growth projections for the various demand Customer Classs were input into the WEAP model in order to project water usage and the impacts of conservation programs. IWA's 2007 WMP

Update (Dudek, 2008) projects water demands to reach 43,700 AFY (39.0 MGD) at ultimate build-out. However, the timing for reaching "ultimate build-out" is currently uncertain.

Projection inputs into the WEAP model were based on the planned developments as identified in Indio's 2007 WMP Update (Dudek, 2008) and metered account projections as presented in IWA's 2005 Urban Water Management Plan (UWMP)-Addendum (B&V, 2008c). Table 6-3 presents the number of accounts in 2008, based on metered data and the projected number of accounts by 2020 and 2030 as provided by IWA. Growth in years between 2008, 2020, and 2030 was assumed to be linear.

Table 6-3
Projected Growth in Accounts for All Customer Classs

Customer Class	Number of Accounts		
	2008	2020	2030
Single-Family Residential	17,239	24,710	31,627
Multi-Family Residential	387	507	612
Commercial	786	1,376	1,789
City	154	259	303
Construction	44	83	92
Irrigation	363	502	612
Government	83	113	143
Other	1	1	1

For modeling purposes, it was necessary to distribute these new accounts among the six specified zones. Maps in IWA's 2007 WMP (Dudek, 2008) facilitated the distribution of growth for residential and commercial accounts. Table 6-4 presents the proportion of single-family residential growth in each of the zones from 2008 through 2020 and from 2020 through 2030. As shown in the table, 56 percent of all new single family homes constructed between 2008 and 2020 will be constructed in the Upper I-10 Zone, and 98 percent of all new single family homes constructed between 2020 and 2030 will be constructed in the Upper I-10 Zone.

Table 6-4
Proportionate Number of New Single-family Residential Accounts in Each Zone

Zone		2008 – 2020	2020 – 2030
1	Upper I-10	56%	98%
2	North Indio	-	-
3	West Central	-	-
4	Central	3%	2%
5	South West	12%	-
6	South East	28%	-
Total Number of New Accounts		7,471	6,917

The distribution of growth for single-family residential accounts served as a template for the distribution of new accounts in other Customer Classes namely Multi-Family Residential, City, Irrigation, and Government. The rationale was that new single-family developments will likely require additional city and government amenities (parks, schools, etc.).

Construction meters were not assigned to a zone, since most construction meters are employed on construction sites throughout the City of Indio. No growth was projected in the "Other" Customer Class, which is associated only with the Upper I-10 Zone.

For WEAP model development and consumption projections, the multi-family residential Customer Class was further disaggregated from the number of accounts in each zone into the number of dwelling units in each zone.

IWA's 2007 WMP Update presents a consumption rate of 456 gpd per unit for multi-family residential units, based on 2006 consumption values. Utilizing this current information (456 gallons per day per unit [gpd/unit]), the number of existing units for each of the zones was calculated along with the average number of dwelling units per account.

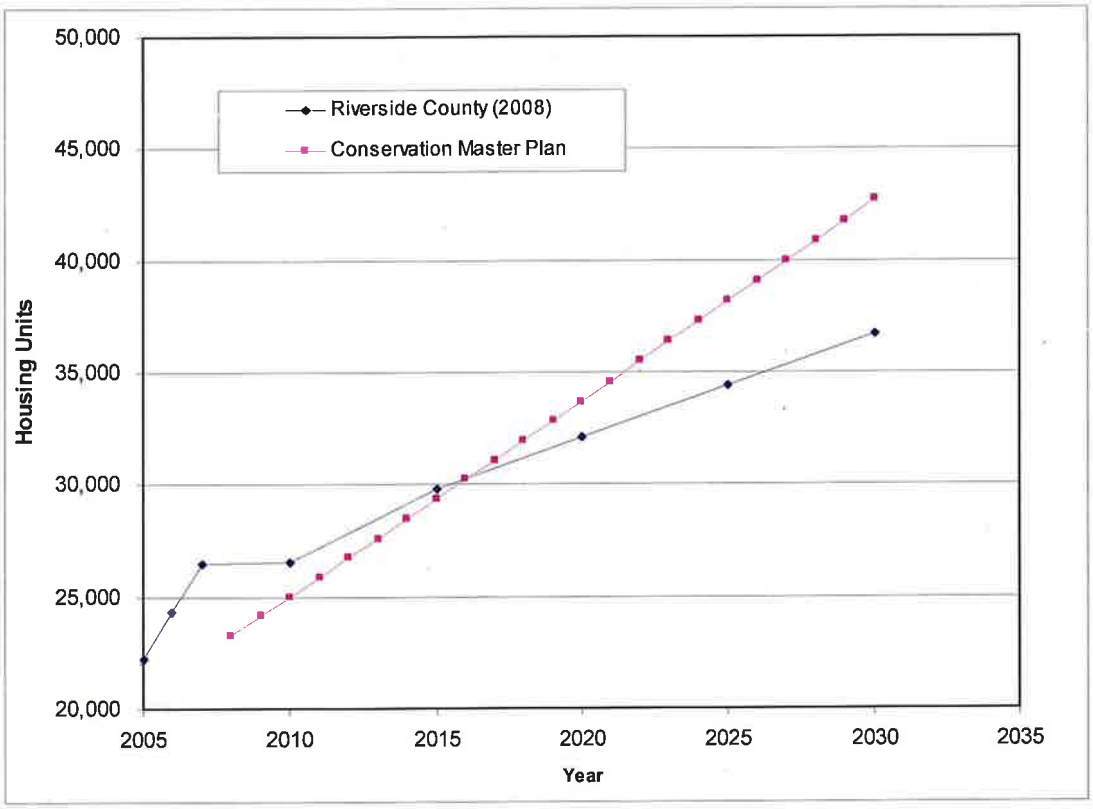
Table 6-5 presents the average number of multi-family dwelling units per account for each zone as well as the estimated number of multi-family residential dwelling units for each zone for 2008, 2020, and 2030.

Table 6-5
Estimated Number of Multi-family Residential Accounts by Zone Based on IWA Account Projections

Zone		Average No. of Units/Account	No. of Multi-Family Residential Units		
			2008	2020	2030
1	Upper I-10	20	600	1,951	4,012
2	North Indio	8	432	432	432
3	West Central	0	-	-	-
4	Central	11	2,168	2,211	2,232
5	South West	13	660	855	855
6	South East	40	2,164	3,530	3,530
	Total		6,024	8,978	11,061

Values presented in Table 6-5 indicate that apartment buildings and other multi-family residential complexes in the South East Zone tend to be larger with many more units than complexes in other parts of the City of Indio. Figure 6-3 illustrates how the projected growth total dwelling units for the City compares to Riverside County (2008) projections.

Figure 6-3
Projections for Total Dwelling Units for the City of Indio



According to Figure 6-3, the Riverside County (2008) projections for dwelling units in year 2030 are well below those estimated in this CMP document. Some of this discrepancy may be due to the fact that the County does not consider the planned developments currently outside of the City's borders, which will be annexed into the City in the future. These developments would have been included in the estimates for new accounts utilized in this CMP document.

The distribution of new commercial accounts among the six zones was based on planned commercial developments as reported in IWA's 2007 WMP (Dudek, 2008). Table 6-6 presents the proportion of commercial development planned for each of the zones from 2008 through 2020 and from 2020 through 2030. Commercial developments categorized under mixed use projects were assumed to be developed from 2020 through 2030. The current average parcel size per account is also provided. As shown in the table, 50.7 percent of all commercially developed lands between 2008 and 2020 will be developed in the Upper I-10 Zone, as will 84.1 percent of all commercially developed lands between 2008 and 2020.

Table 6-6
Proportion of New Commercial Developments in Each Zone

Zone		2008 - 2020	2020 - 2030	Average Parcel Size per Commercial Account (acres)
1	Upper I-10	50.7%	84.1%	18.5
2	North Indio	12.4%		5.2
3	West Central	15.7%		5.3
4	Central	6.4%	15.9%	3.0
5	South West	9.8%		2.5
6	South East	5.1%		3.3
Total No. of New Accounts		590	413	

The estimated average parcel size per account indicates that, in the Upper I-10 Zone, the commercial accounts are attributed to very large properties, likely consisting of the big box retailers and/or large shopping malls with multiple units per meter. Other areas of the City of Indio have a much smaller ratio of parcel size to accounts.

Table 6-7 presents estimates for the projected number of commercial accounts by zone for 2008, 2020, and 2030.

Table 6-7
Estimated Number of Commercial Accounts by Zone Based on IWA Account Projections

Zone		No. of Commercial Accounts		
		2008	2020	2030
1	Upper I-10	34	333	680
2	North Indio	174	247	247
3	West Central	23	116	116
4	Central	300	338	403
5	South West	106	164	164
6	South East	149	179	179
	Total	786	1,376	1,789

6.5 Scenario Development and Forecasting

Three scenarios were modeled using WEAP:

- Baseline Conservation Plan (BCP): Minimal conservation program. This scenario projected demands without current ongoing programs assuming the current plumbing codes remain in place and that natural replacement of fixtures continues at a normal rate.
- Moderate Conservation Plan (MCP): Medium intensity conservation program. This scenario developed a mid range conservation program.
- Aggressive Conservation Plan (ACP): Aggressive conservation program achieving full implementation of programs sooner than the MCP. This scenario is aimed to achieve maximum water savings.

The WEAP Model was used to forecast water saving and costs and costs of water saved from each program that constitutes a scenario.

6.6 Baseline Conservation Plan

The BCP assumed that no changes would be made to reduce average consumer demands other than that which may occur as a result of water conserving plumbing codes for new construction. Figure 6-4 illustrates trends in residential per capita water usage since 2002 for the Upper I-10 and Central Zones and for the City as a whole. The Upper I-10 Zone has seen the largest change in residential per capita consumption rates, while the Central Zone has seen the smallest.

Figure 6-4
Reductions to Per Capita Water Usage for the Residential Customer Class Due to New Construction

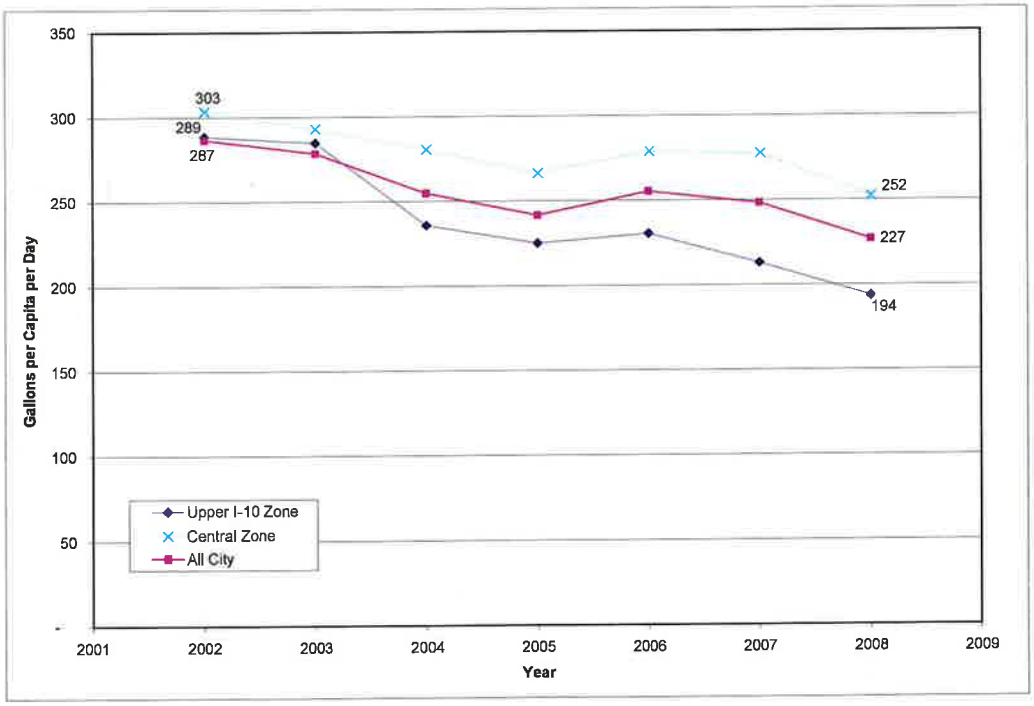
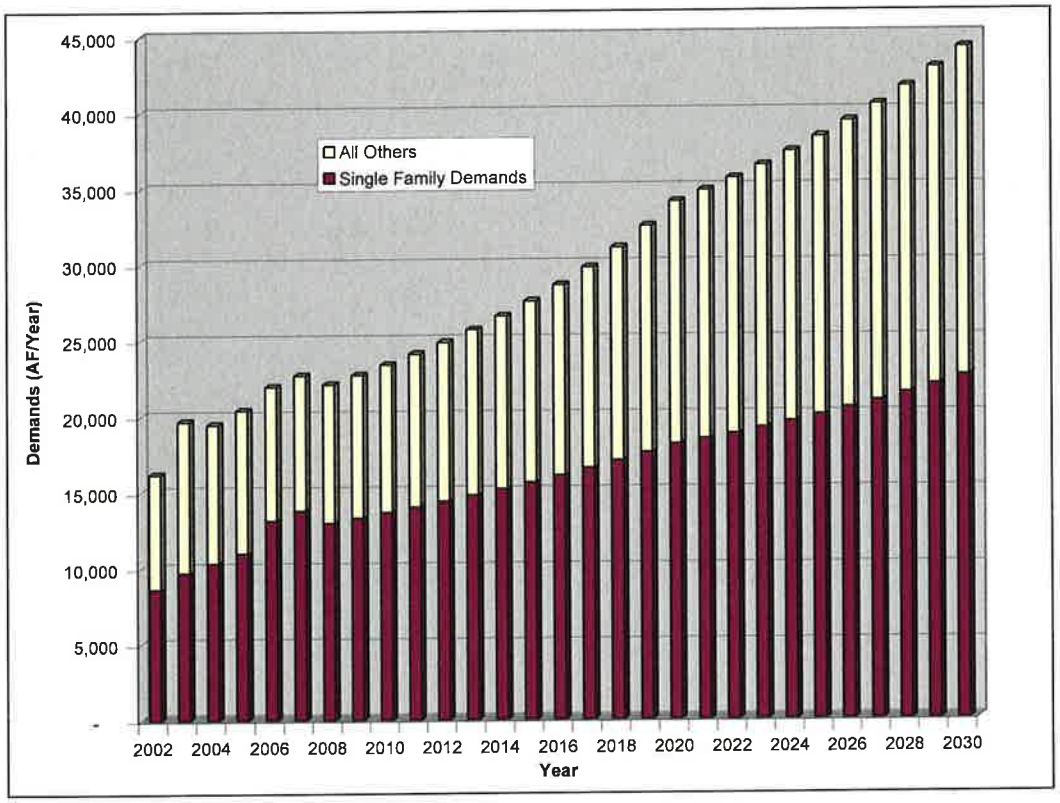


Figure 6-5 illustrates the projected water consumption through 2030 assuming that consumption rates from 2008 would be applied into the future.

Figure 6-5
WEAP Model Results for the Baseline Scenario



Without a more aggressive conservation program, IWA would need to supply approximately 44,000 AFY by 2030 to meet demands.

6.7 Moderate Conservation Plan

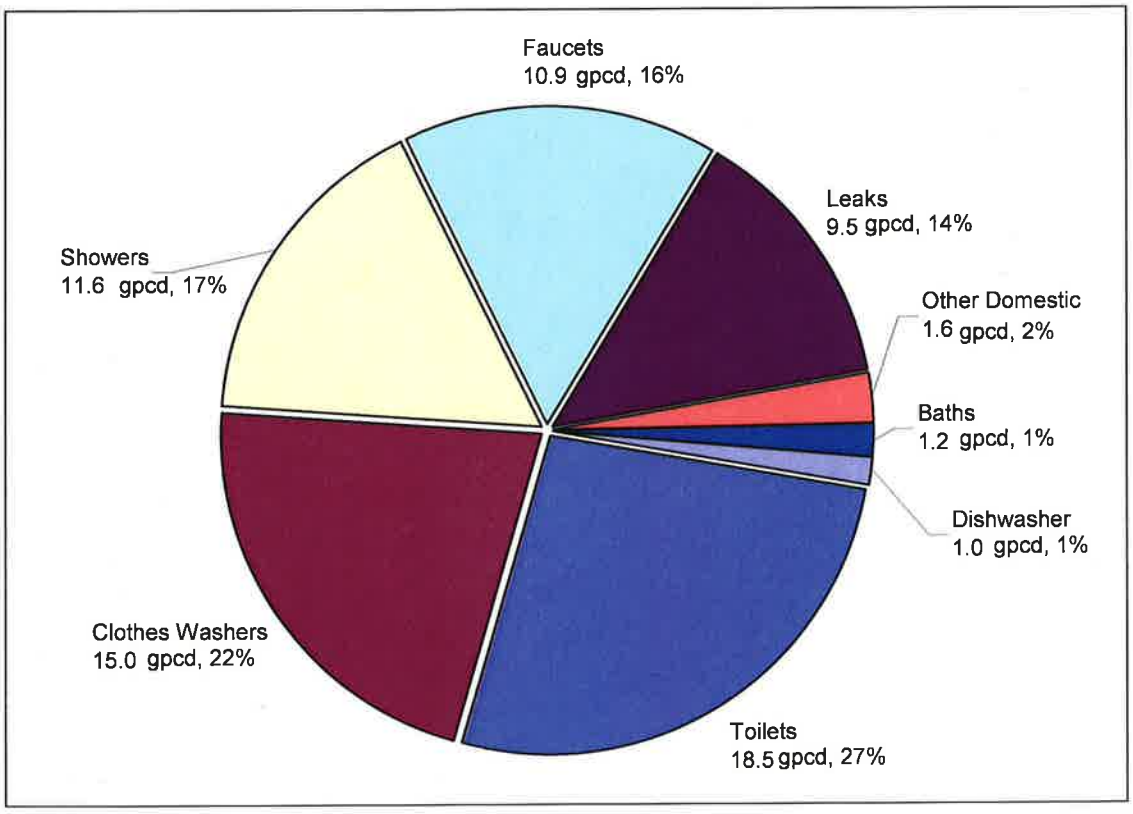
The MCP was designed to achieve at least a 20 percent reduction in current per capita potable water usage for all demand Customer Classes by 2020. This goal is mandated by the Governor and the SWRCB for all public utilities in the State of California.

Based on meter data, IWA's average per capita water usage rate for all Customer Classes is approximately 285 gpcd (years 2002 through 2008). To achieve State mandates, this usage rate

should reduce to 228 gpcd by 2020. This approach assumed that the 7 year average would be an appropriate baseline for estimating target use levels. Assuming Riverside County (2008) population projections of 93,115 persons by 2020, this is equivalent to 23,780 AFY. For comparison, in 2008 consumption by all Customer Classs was 22,160 AF, for an approximate population of 77,460. In order to achieve the State's "20 percent by 2020" mandate, the MCP included potable water savings realized by the construction of a water reclamation facility (WRF) to supply irrigators with reclaimed water instead of the potable groundwater they currently receive.

The MCP relies heavily on the successful implementation of a residential re-landscaping program that promotes replacing sod with drought tolerant plants, or with desert landscaping. City ordinances would also be necessary for this component of the program to ensure installation of desert landscaping at all new residential developments. Another important component would be the re-landscaping of municipal lands with desert landscapes. This program should be given the highest priority as it would provide residents with demonstration gardens and would show residents that the City is committed to water conservation. The final water efficiency component of the MCP is single-family residential toilet replacements. A toilet retrofit program was targeted as toilet flushes represent the highest proportion of indoor water usage (AWWARF, 1999a). Figure 6-6 illustrates findings from the AWWARF study for residential indoor water usage.

Figure 6-6
Indoor Water Use (AWWARF, 1999a)



Achieving the 20% reduction that the State mandates would also require the conversion of many of the local irrigators from IWA's potable groundwater supplies to recycled water. Assumptions associated with the individual components of the MCP were:

Assumptions:

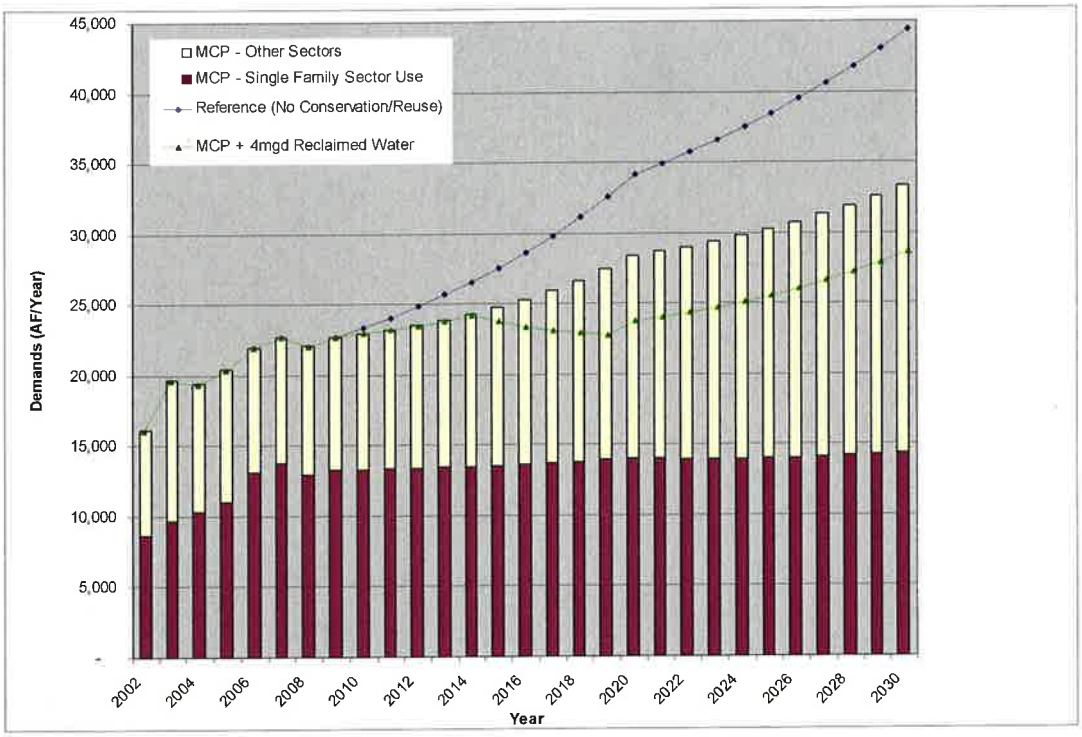
- Single Family Landscaping
  - 70 percent of all SF water use is for outdoor, and 95 percent of outdoor water use is for irrigation.
  - Re-landscaping to drought tolerant plants is achieved in 80 percent of homes by 2030.
  - A re-landscaping program starts in 2010.
  - A 60 percent reduction in irrigation water use is achieved.
- Multi- Family Landscaping

- 45 percent of all MF water use is for outdoor, and 95 percent of outdoor water use is for irrigation.
- Re-landscaping to drought tolerant plants is achieved in 80 percent of MF accounts by 2030.
- A re-landscaping program starts in 2010.
- A 60 percent reduction in irrigation water use is achieved.

- Municipal Irrigation
  - 51 percent of all municipal water use is for outdoor irrigation other than parks.
  - Re-landscaping to drought tolerant plants is achieved in 100 percent of municipal irrigation accounts by 2020. These include all City Irrigation accounts and all Lighting & Landscaping accounts.
  - A re-landscaping program starts in 2010/
  - A 60 percent reduction in irrigation water use is achieved.
- Single Family Toilets
  - Toilet flushing accounts for 27 percent of all indoor water use.
  - 80 percent of all toilets in homes built prior to 1992 are changed by 2030.
  - A 30 percent water savings is achieved with new low flush toilets (1.6 gallons per flush [gpf]).
- Irrigator Supply Conversion
  - A WRF is online by 2015.
  - The WRF capacity is at least 4 MGD with 100 percent of reclaimed water supply utilized by irrigators by 2020.

Figure 6-7 illustrates the projected water consumption through 2030 under the MCP.

Figure 6-7
WEAP Model Results for the Moderate Conservation Scenario



Under the MCP, the estimated annual consumption of potable water sources in 2020 would be approximately 23,760 AFY. Per capita daily potable water use would be 228 gallons. Estimated annual water savings resulting from each of the components of the MCP as well as cumulative savings are presented in Table 6-8.

Table 6-8
Estimated Annual Water Savings (AF) from Programs under the MCP

Program	2010	2015	2020	2025	2030	Cumulative Water Savings
Municipal Re-Landscaping	51	382	1,008	1,203	1,453	17,200
Residential Re-landscaping	389	2,438	4,754	7,001	9,531	100,300
Residential Indoor conservation: toilet replacement	6	36	70	102	135	1,500
Recycled Water (4 mgd)	-	896	4,481	4,481	4,481	62,700
PROGRAM SAVINGS	445	3,751	10,312	12,787	15,599	181,600

6.8 Aggressive Conservation Plan

The ACP would have many of the same component programs as the MCP, but would achieve full implementation by 2030. The ACP assumes the successful implementation of a residential re-landscaping program as well as the re-landscaping of commercial properties. City ordinances would need to be drafted to require desert landscaping at any new developments, be they residential or commercial. Again the re-landscaping of municipal lands with desert landscapes would be an important component providing demonstration gardens to residents, developers, and business owners. The indoor water efficiency component (toilet replacements) would be expanded to include all residential and commercial properties older than 1992. Assumptions associated with the individual components of the ACP were:

Assumptions:

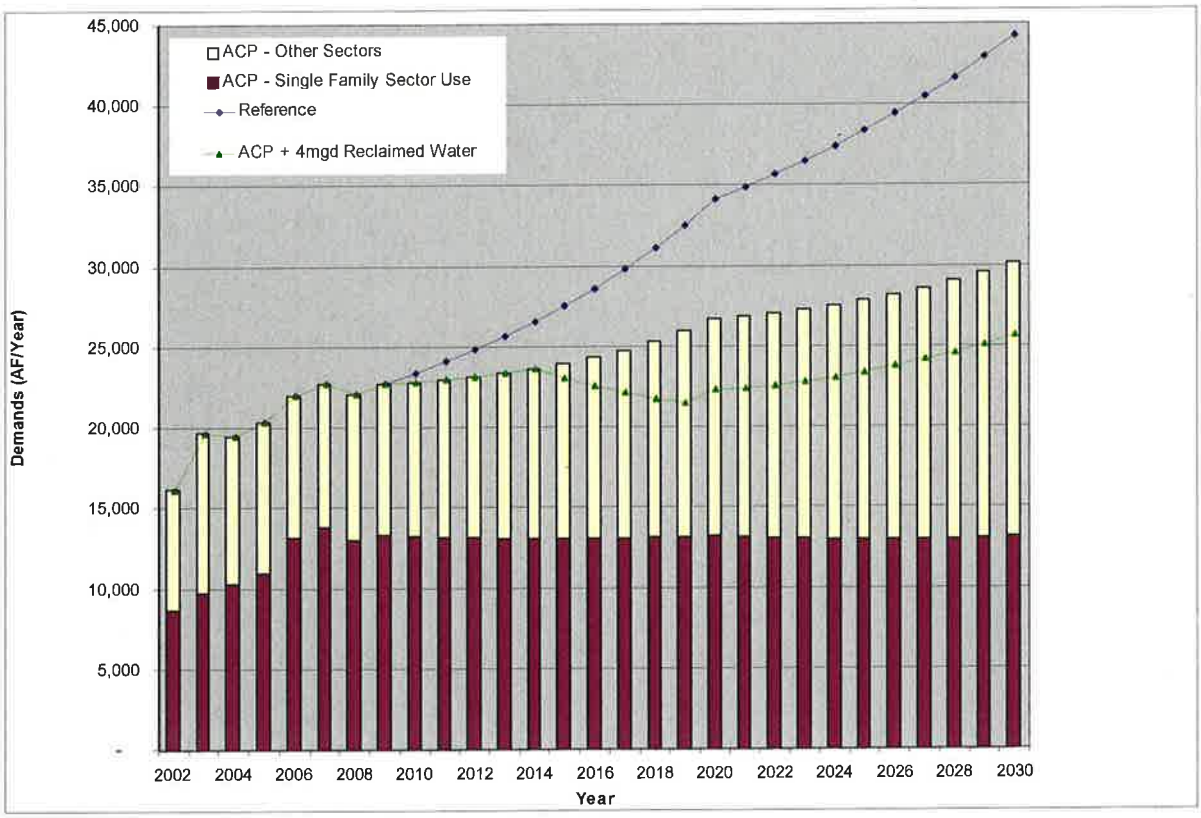
- Single Family Landscaping
  - 60 percent of all SF water use is for outdoor, and 95 percent of outdoor water use is for irrigation.
  - Re-landscaping to drought tolerant plants is achieved in 100 percent of homes by 2030.
  - A re-landscaping program starts in 2010.
  - A 60 percent reduction in irrigation water use is achieved.
- Multi- Family Landscaping
  - 45 percent of all MF water use is for outdoor, and 95 percent of outdoor water use is for irrigation.
  - Re-landscaping to drought tolerant plants is achieved in 100 percent of MF accounts by 2030.
  - A re-landscaping program starts in 2010.
  - A 60 percent reduction in irrigation water use is achieved.
- Municipal Irrigation
  - 51 percent of all municipal water use is for outdoor irrigation other than parks.
  - Re-landscaping to drought tolerant plants is achieved in 100 percent of municipal irrigation accounts by 2020. These include all City Irrigation accounts and all Lighting & Landscaping accounts.
  - A re-landscaping program starts in 2010.
  - A 60 percent reduction in irrigation water use is achieved.
- Commercial Landscaping & Toilet Retrofit
  - A re-landscaping program starts in 2010.
  - A toilet retrofit program starts in 2010.

- A 25 percent reduction in total commercial water use is achieved.

- Single Family Toilets
  - Toilet flushing accounts for 27% of all indoor water use.
  - A toilet retrofit program starts in 2010.
  - 100 percent of all toilets in homes built prior to 1992 are changed by 2030.
  - At least a 30 percent water savings is achieved with new low flush toilets (1.6 gpf).
- Irrigator Supply Conversion
  - A Water Reclamation Facility is online by 2015.
  - The WRF capacity is at least 4 MGD with 100 percent of reclaimed water supply utilized by irrigators by 2020.

Figure 6-8 illustrates the projected water consumption through 2030 under the MCP.

Figure 6-8
WEAP Model Results for the ACP Through 2030



Under this conservation plan, the estimated annual consumption of potable water sources in 2020 would be approximately 22,260 AF/year, saving an additional 1,500 AF/year in comparison to the MCP. Per capita daily potable water use would be 213 gallons. Estimated annual water savings resulting from each of the components of the ACP as well as cumulative savings are presented in Table 6-9.

Table 6-9
Estimated Annual Water Savings from Programs Under the ACP Through 2030

Program	2010	2015	2020	2025	2030	Cumulative Water Savings
Municipal Re-Landscaping	51	382	1,008	1,203	1,453	17,200
Residential Re-landscaping	465	2,862	5,488	7,957	10,679	114,600
Residential Indoor conservation: toilet replacement	7	43	83	121	159	1,700
Recycled Water (4 MGD)	44	314	755	1,197	1,761	62,700
Commercial Water Efficiency Program	-	896	4,481	4,481	4,481	16,500
PROGRAM SAVINGS	566	4,496	11,815	14,959	18,532	212,700

The 25 percent reduction in commercial consumption may be entirely feasible simply by expanding both the toilet replacement program and the re-landscaping programs to the commercial Customer Class, including hotels and motels. Table 6-10 presents one study's findings for water use in commercial and institutional settings.

Table 6-10
Water Use Distribution (Percent) for Common Commercial and Institutional Settings

Water Use (Percent)	Commercial Setting			
	Hotels/Motels	Hospitals	Offices	Schools
Restrooms	30	40	40	45
Landscaping	10	5	22	25
Cooling/Heating	15	13	28	20
Other	45	42	10	10
Source: North Carolina Department of Environment and Natural Resources (NCDENR), 2009				

7.0 IMPROVED AND PROPOSED CONSERVATION STRATEGIES

This chapter presents the evaluation of CUWCC BMPs and their applicability to the IWA system followed by a 5-year implementation plan for CUWCC's DMMs. Conservation audit guidelines are then presented, followed by a discussion of emerging conservation technologies.

7.1 Evaluation of CUWCC BMPs

7.1.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

A water survey program for IWA's residential customers will be a key component of any conservation plan. Through the survey program, residents can request IWA staff to visit their homes and identify opportunities for reducing water wasting, as well as identify potential areas where further water savings could be achieved, such as alternate landscaping opportunities that may exist for the homeowners to reduce overall outdoor consumption.

According to CUWCC guidelines, IWA should implement this program by July 1, 2011 and target to provide surveys to greater than 15 percent of residential accounts (15 percent each for single-family and multi-family residential accounts) by 2020. Table 7-1 presents the CUWCC's assumptions for water savings as a result of a water survey program.

Table 7-1
CUWCC Water Savings Assumptions for a Residential Water Survey Program

Source of Water Savings	Pre-1980 Construction	Post-1980 Construction
Low-flow showerhead retrofit	7.2 gpcd	2.9 gpcd
Toilet retrofit	1.3 gpcd	0.0 gpcd
Leak Repair	0.5 gpcd	0.5 gpcd
Landscape Survey (Outdoor Use Reduction)	10%	10%

The cost for each residential survey is estimated as $110/survey, which accounts for the time spent by IWA staff to perform surveys and track program implementation. This value is based on presented costs by other utilities for residential surveys (Alan Plummer Associates, Inc. [APAI], 2005).

IWA may be able to reach additional residents for this DMM through some of their current conservation programs. IWA may want to consider requiring in-home surveys for any residents interested in participating in their Smart Controller and/or Re-landscape Rebate programs.

7.1.2 Residential Plumbing Retrofit

A residential plumbing retrofit program will contribute to the overall reduction in indoor water use in the residential Customer Class. This program targets residences constructed prior to

1992. For IWA, marketing of such a program should be targeted to the North Indio and Central Zones of the City, where pre-1992 construction accounts for 97 percent and 77 percent of residences, respectively.

According to CUWCC guidelines, IWA should implement this program by July 1, 2011 and should target to provide devices to not less than 10 percent of residential connections each reporting period (every two years), resulting in at least 50 percent of pre-1992 homes retrofitted by 2020. Table 7-2 presents the CUWCC's assumptions for water savings as a result of a water survey program.

Table 7-2
CUWCC Water Savings Assumptions for a Residential Plumbing Retrofit Program

Source of Water Savings	Pre-1980 Construction	Post-1980 Construction
Low-flow showerhead retrofit	7.2 gpcd	2.9 gpcd
Toilet retrofit	1.3 gpcd	0.0 gpcd

Other utilities implement residential plumbing retrofit programs by the actual distribution of retrofit kits to their residential customers at no cost to the customers. The kit should include at a minimum one new showerhead and two aerators (one kitchen and one bathroom). The estimated cost of such a kit is $10. The kits should be installed for any customers receiving residential water surveys. This approach for implementation avoids added administrative costs that come with voucher or rebate programs. IWA will need to annually track the number of kits distributed.

7.1.3 System Water Audits, Leak Detection, and Repair

IWA has already achieved the CUWCC's goal of less than 10 percent unaccounted for water losses in its system. The WMP (Dudek, 2008) estimates IWA's unaccounted for water loss to be approximately 7.5 percent, and IWA would like to further reduce this to between 3 and 5 percent. Such a reduction could result in water savings of approximately 800 to 1,200 AFY by 2020.

According to CUWCC guidelines, IWA should implement this program by July 1, 2011 and should target to complete a pre-screening system audit annually to determine the need for a full-scale system audit. Table 7-3 presents the estimated water savings as a result of a system audit program.

Table 7-3
Water Savings for a System Audit and Leak Detection/Repair Program

Source of Water Savings	Water Savings
Unaccounted for Water	2.5 to 4.5 percent

The costs associated with the system audit program should generally be covered within IWA's annual operating and maintenance costs. IWA will need to track their audit results and attempt to categorize their non-revenue water. See Figure 7-1 in Section 7.3 for a list of non-revenue water categories.

7.1.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

Currently, 100 percent of IWA's customers are metered for water use, and meters are required for any new service connections. This DMM enables IWA to meter and bill customers based on their actual volume of use. The CUWCC estimates that metered accounts along with volumetric rates can result in a 20 percent reduction in demand. IWA has probably already realized the savings associated with metering all accounts. A tiered rate structure would be necessary to reduce further usage under this DMM.

IWA is actively maintaining and upgrading their meter system with their meter replacement program, which began in 2006. In this program, IWA is replacing all existing direct-read meters with a wireless automated meter reading system, with priority for replacement to older meters, which are more susceptible to failure. IWA has estimated an annual cost of $550,000 for this program in 2010 for replacing 3,000 meters. Residential meter change out should be nearly complete by the end of 2010. Once the meter change out is fully implemented, the program will be on-going in order to address problems associated with meter failure and slowing. However, the costs of the program should be significantly reduced.

7.1.5 Large Landscape Conservation Programs and Incentives

A large landscape water conservation program with incentives for IWA's CII and irrigation customers could be an important component of their long-term conservation plan. IWA should strive to provide educational opportunities to these clients about the benefits and opportunities for reducing their outdoor water usage. IWA has already established a requirement that separate meters for irrigation be installed on all commercial, industrial, and apartment building properties by January 1, 2013. This proactive approach will facilitate program implementation, effectively enabling IWA to identify, prioritize, and market customers. An important aspect of this program will be surveys/water audits of landscaping water usage. According to CUWCC guidelines, IWA should implement this program by July 1, 2012 and should target to provide surveys to greater than 15.0 percent of large landscape irrigation accounts by 2021. Large landscape surveys are estimated to result in a 15 percent reduction in demand by these users.

The cost for each CII survey has been estimated as twice that of a residential survey or $220/survey, which accounts for the time spent by IWA staff to perform surveys and track program implementation.

7.1.6 High-Efficiency Clothes Washing Machine Financial Incentive Programs

A high-efficiency clothes washing machine (HECW) financial incentive program will contribute to the overall reduction in indoor water use in the residential Customer Class. This program

should target all residences and should be begin to be implemented by July 1, 2012 with full implementation in 2.5 years (2014). CUWCC developed a Coverage Goal (CG) system to more easily determine coverage progress and allow agencies to obtain credit for promoting ultra high efficiency machines. The annual CG is calculated as:

$$CG = TotalDwellingUnits \times 0.0768$$

Total dwelling units (DUs) are estimated to be approximately 25,860 at implementation (2011). The calculated coverage goal would be 1,986 HECWs installed over the 2.5 year program, or 794 units per year. IWA may want to consider developing a tiered incentives program with the largest incentives for washing machines with a water factor (WF) equal to or less than 6.0. Each replaced machine could save approximately 120,000 gallons of water over the life of the machine (estimated as 14 years).

The HECW Machine Financial Incentives Programs can be implemented by supplying rebates to their customers for the purchase of approved HECW machines. A rebate of $100/HECW is suggested at this time.

7.1.7 Public Information Programs

A public information program for IWA's customers will be a key component of any conservation plan. IWA has been proactive and implemented a public information program years before signing on to the CUWCC's MOU. Through the program, IWA can assist customers in identifying opportunities for conservation via brochures, media events, service announcements, workshops, and other means. The CUWCC does not have a quantifiable value for water savings associated with this DMM. However, savings could be significant if the program targets residential outdoor use, including demonstration gardens for re-landscaping away from turf.

Future costs for the public information program have been previously estimated by IWA (B&V, 2005c). Table 7-4 shows the estimated annual costs for the program through 2030.

Table 7-4
Estimated Costs for IWA's Public Information Program

Program	2010	2015	2020	2025	2030
Public Information Program	$6,500	$23,000	$38,000	$38,000	$38,000

7.1.8 School Education Programs

A school education program will contribute to the long-term reduction in water use as a result of actual changes to water use behaviors in City of Indio's youth. According to CUWCC guidelines, IWA should implement this program by July 1, 2011; however, the CUWCC has not established any quantifiable goals or targets for the implementation of this program.

Satisfying CUWCC requirements under this DMM will require:

- Implementation of a school information program to provide instructional assistance, educational materials, and classroom presentations. The program should identify urban, agricultural, and environmental issues and conditions in the local watershed. The program should be tailored and implemented by grade level, and any materials shall meet State education framework requirements.
- Tracking/documentation of materials distributed, as well as the number of presentation made and estimates for the number of students reached.

The CUWCC does not have a quantifiable value for water savings associated with this DMM.

Costs for this program have been estimated as $10/year per student reached.

7.1.9 Conservation Programs for Commercial, Industrial, and Institutional Accounts

Conservation programs for IWA's CII customers could be an important component for their long-term conservation plan. Under this BMP, IWA will need to identify and rank CII customers by their water use, develop a ULFT program, and either implement a CII water use survey and incentives program or establish and meet CII conservation performance targets. According to CUWCC guidelines, IWA should implement this program by July 1, 2012.

If IWA chooses to pursue a CII Survey and Customer Incentives Program, then they should work to supply surveys to 10 percent of its CII customers in 10 years. However, if IWA pursues a CII Conservation Program, then that program should achieve a 10 percent reduction in the CII baseline water use in 10 years. Some utilities have achieved this by supplying one-time grants to CII customers for water conserving measures, both indoor and outdoor. The cost of the program could be directly linked to both the water savings and the cost of the water. Potable water supplied by IWA currently costs the utility approximately $60/AF with an additional $92/AF paid to CVWD as a replenishment fee. IWA may want to consider spending an equivalent of $60/AF of water saved on this program.

7.1.10 Wholesale Agency Assistance Programs

IWA does not receive or provide wholesale water. This BMP is not applicable to IWA's service area.

7.1.11 Retail Conservation Pricing

Retail conservation pricing provides economic incentives to customers to use water efficiently. The goal of this BMP is to recover the maximum amount of water sales revenue from volumetric rates that is consistent with utility costs, financial stability, revenue sufficiency, and customer equality. Although IWA has not yet recommended conservation pricing to the Board, IWA has been proactive and has initiated a feasibility assessment of this BMP for the IWA service area. By signing CUWCC's MOU, the City of Indio is expected to implement conservation pricing by July 1, 2011.

7.1.12 Conservation Coordinator

A Conservation Coordinator provides oversight of conservation programs and BMP implementation, as well as communicating and promoting water conservation issues. IWA has been proactive and in 2007 hired an Environmental Programs Coordinator to facilitate their conservation efforts. The coordinator oversees not only water conservation, but also other environmental programs within the City of Indio.

The annual budget for the conservation coordinator program was estimated to be $463,300 in 2010 according to IWA's 2005 UWMP Update Addendum (B&V, 2005c). Via extrapolation, the 2015 budget is estimated as $541,100.

7.1.13 Water Waste Prohibition

A Water Waste Prohibition is an important component for any conservation plan and refers to enactment and enforcement measures that prohibit gutter flooding, single pass cooling system in new connections, non-recirculation system in all new conveyer car washes and commercial laundry systems, and non-recycling decorative water fountains.

The City of Indio has already passed an ordinance (1528) prohibiting water wasting that results in flows onto roadways, adjacent property, or non-irrigated property. In addition, the City has also passed ordinance 257, which states: "Chapter 54.050 It shall be unlawful for any person to willfully or neglectfully waste in any manner, any person having knowledge of any conditions whereby water is being wasted, shall immediately notify the Water Department of that fact."

Other components of this BMP have not yet been addressed. These include:

- single pass cooling system in new connections
- non-recirculation system in all new conveyer car washes and commercial laundry systems

According to CUWCC guidelines, IWA should prohibit the remaining Water Waste Prohibition components by July 1, 2011.

7.1.14 Residential Ultra Low Flush Toilet Replacement Programs

A residential ULFT replacement program seeks to replace high consuming toilets (≥3 gpf) with the more efficient ULFTs that use 1.6 gallons or less per flush in both single-family and multi-family residences. At a minimum, the program should replace as many toilets as would be replaced under a City ordinance that required ULFT retrofits on resale for all homes older than 1992. The program may achieve these water savings through financial incentives/rebates. According to CUWCC guidelines, IWA should implement a residential ULFT replacement program by July 1, 2011.

Under the residential ULFT replacement program, some agencies provide rebates for the purchase of ULFT toilets, while others actually supply and install the toilets themselves. IWA

can consider either approach to implementation of this program. An estimated cost of $150 per ULFT toilet replaced was assumed for this DMM.

7.2 5-Year Implementation Plan for CUWCC's DMMs

As a signatory to the CUWCC's MOU, the City of Indio must implement all of the DMMs and by 2015 will have gone through two reporting periods, supplying estimated water savings and costs of each of their DMM programs to the CUWCC. Table 7-5 presents estimates for the minimum amount of progress that IWA should achieve through their DMM programs by 2015. Estimated costs for the first five years of their programs, through 2015, are also presented.

Table 7-5
Estimated Progress and Costs Through 2015 for the Implementation of DMM Programs

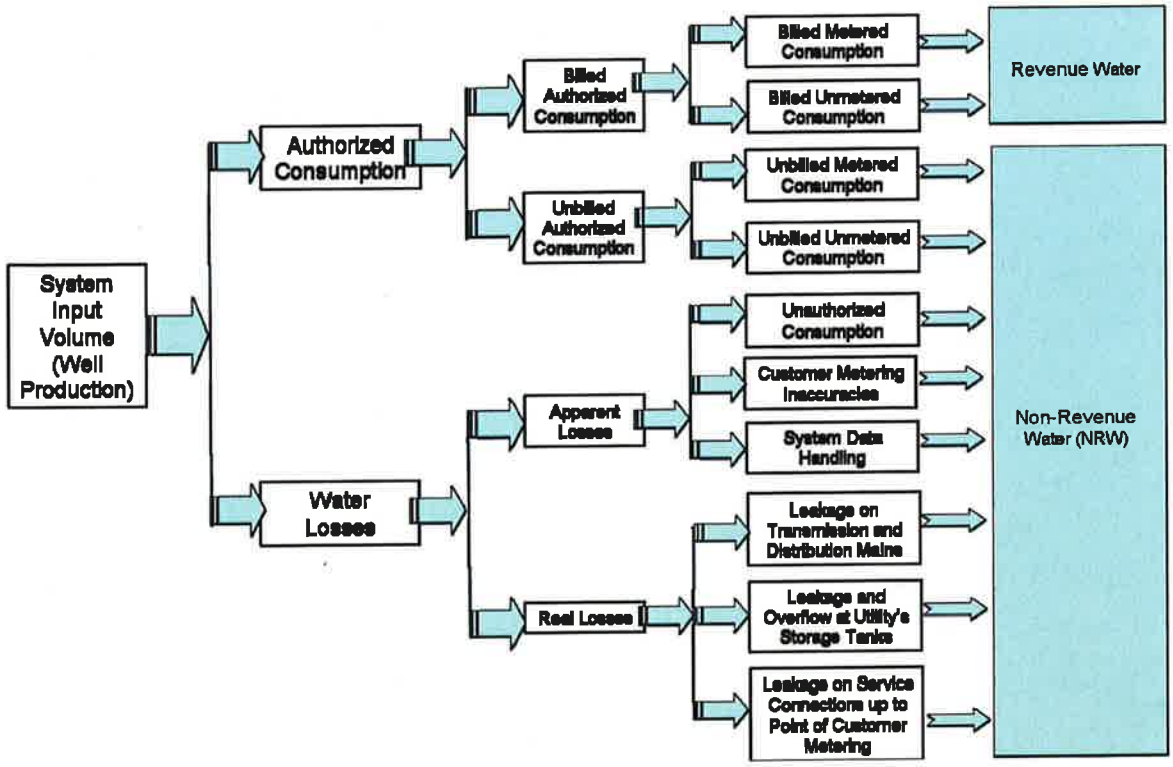
No.	Demand Management Measure	Implementation Date – July 1	Progress by 2015	Estimated Program Cost by 2015 (Cumulative)
1	Residential Surveys: Water survey programs for single-family residential and multi-family residential connections	2011	Surveys provided to ≥ 1,400 residential accounts	$154,000 ($110/audit) [A]
2	Residential Retrofits: Residential plumbing retrofits	2011	≥ 25% of pre-1992 DUs retrofitted (=approximately 2.510 DUs)	$25,100 ($10/kit) [A]
3	System Water Audits: Distribution system audits, leak detection, and repair	2011	Pre-screening audit performed annually	-
4	Metering: Metering with commodity rates for all new connections and retrofit of existing connections	N/A	N/A	-
5	Landscape: Large landscape conservation programs and incentives	2012	Surveys provided to ≥ 6% of CII and/or irrigation accounts (> 55 accounts)	$12,200 ($220/audit)
6	Clothes Washers: High-efficiency washing machine rebate programs	2012	1,490 HECW units installed through program	$149,000 ($100/HECW) [A]
7	Public Information: Public information programs	2011	Maintain program	$82,000 [B]
8	School Education: School education programs	2011	Maintain program	$40,000 ($10/student/year)
9	CII: Conservation programs for commercial, industrial, and institutional accounts	2012	▸ Ranked list by water use of CII users ▸ Accelerated ULFT retrofits to achieve 1.2% of Water Savings Potential ▸ Annual reporting to CUWCC ▸ Surveys & incentives supplied to 4% of CII customers OR reduce CII water use by approximately 100 AF	$6,000 ($60/AF saved)
10	Wholesale Incentives: Wholesale agency assistance programs	N/A	N/A	-
11	Retail Conservation Pricing	2011	Maintain rate structure	-
12	Conservation Coordinator: Designation of a water conservation coordinator	2011	Maintain position and supporting staff	$2,467,000 [B]
13	Water Waste Prohibition	2011	Maintain prohibition	-
14	Residential ULFT replacement program	2011	Water savings equivalent to ULFT retrofits in > 740 single-family homes built prior to 1992	$111,000 ($150/toilet)

[A] APAI, 2005.
[B] B&V, 2008c.

7.3 Conservation Audits, Flow Process, and Guidance

A water audit traces the flow of water from its source or point of withdrawal, through the water distribution system and onto customer properties. It details the variety of consumption and losses that exist in a community water system, with a goal of assisting the public water supplier in selection and implementation of programs to reduce system losses. This discussion of audits follows the AWWA and International Water Authority's water audit methodology (AWWA, 2009). Figure 7-1 presents a simplistic flow chart for water through a community's water system.

Figure 7-1
Flow Chart for Water Through a Water System



Ensuring that accurate flow meters are in place at supply/production points is an important first step to developing a truthful water audit. The next important step is to summarize all of the authorized water consumption, enabling the utility to determine the magnitude of unaccounted for water, or real water losses. A helpful performance indicator recommended by AWWA is Unavoidable Annual Real Losses (UARL). It is estimated as:

$$UARL = (5.41 \cdot L_m \times 0.15 \cdot N_c + 7.5 \cdot L_p) \cdot P \qquad \text{[gallons/day]}$$

Where, L_m is the length of the water mains [miles], N_c is the number of connections, L_p is the total length of private piping [miles] which can be estimated as ($N_c \times y$), where y is the average distance form the curb stop to the customer's meter [miles], and finally, P, which is the average pressure in the system [psi].

The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is not intended to be the target water loss rate.

Software is available from AWWA to assist in the preparation of a quick preliminary audit. Guidance for a comprehensive water audit is provided in AWWA's M36 publication, Water Audits and Loss Control Programs. Additionally, sample audit worksheets are provided in Appendix D.

7.4 Emerging Technologies

Water efficient technologies, products, and practices are evolving at a fast rate fueled by water shortages and increasing demands. This section identifies and evaluates a variety of emerging technologies, ordinances, and legislative directives aimed at reducing water use. Many of these efficiency practices may be feasible for implementation within IWA's service area. More detailed information on each of the technologies presented can be found in Appendix E.

7.4.1 Emerging Indoor Technologies

A lot of research and development is currently going on for retrofits for residential dwellings and CII accounts. Table 7-6 introduces some of these technologies and estimated water savings associated with their use.

Table 7-6
Emerging Indoor Technologies

Technology	Water use
High Efficiency Toilets (HET) (gpf)	1.28 gpf (20% savings compared to old 1.6 gpf ULFT)
Gravity Fed Single-Flush	1.1 – 1.28 gpf
Dual-Flush	Light flush 0.8-1.1 gpf Heavy flush 1.3-1.6 gpf
Pressure Assist Toilets	1.1-1.2 gpf
Power Assist Toilets	1.0-1.3 gpf
High performance shower heads	1.5 – 2.0 gpm
Low flow lavatory faucet Aerators	1.5 gpm
Hot water demand systems	
HECW	30-35% less water

7.4.2 Emerging Conservation Technologies for Outdoor Water Use

Research and development is currently going on for improving and reducing water use outdoors. Table 7-7 introduces some of these technologies and estimated water savings associated with their use.

Table 7-7
Emerging Outdoor Technologies

Technology	Water Use
Dual meters (better track irrigation on large lots)	-
Precision irrigation	-
Drip or low precipitation	Drip irrigation uses 75% less water
Weather Based irrigation Controllers	Estimated savings of 0.05 AF per station, or 14,600 gallons per household.
Nozzles auto shut off	Can save 7,500 gallons per year
Landscape design- water wise	Water use is reduced by 60% compared to all turf landscaping
Swimming pool covers	Approximately 7,000 gallons per year per pool
Fixed-network metering	Can reduce unaccounted for water to less than 5%

7.4.3 Emerging Conservation Technologies for Commercial, Industrial, and Institutional Customer Classs

Emerging technologies for conservation in CII Customer Classs is also a growing industry. Table 7-8 introduces some of these technologies and estimated water savings associated with their use.

Table 7-8
Emerging Conservation for Technologies CII

Technology	Water Use
High Efficiency Urinals(HEU)	0.5 gpf or less (some new models use 1/8 gpf)
Boiless Food Steamers	Use 14 gpd compared to 400 gpd for boiler-based models
Water brooms	2.8 gpm compared to 8-18 gpm for hose and nozzle

8.0 5-YEAR IMPLEMENTATION PLAN

The proposed conservation plan for IWA incorporates not only the programs under the CUWCC's DMMs, but also components from their current conservation program and a few new components and/or measures. This chapter further addresses any proposed new measures and those components from the current conservation program that should be incorporated into IWA's CMP.

Programs within the CMP focus heavily on reducing demands for residential outdoor water use. The single-family residential Customer Class alone accounts for nearly 60 percent of IWA's total annual demands and approximately 70 percent of single-family residential water usage is outdoors. IWA previously targeted this Customer Class for water conservation through its ordinances with the goal of reducing excess water usage and the wasting of water. Under the public outreach and residential survey programs (DMMs 1, 7 and 8), IWA will have the opportunity to discuss and recommend water efficient landscaping. However, to achieve significant water savings, IWA will need to go farther and develop a comprehensive residential outdoor water conservation program. The Residential Outdoor Conservation Program should include a combination of:

- demonstration gardens
- rebates for turf replacement
- public outreach and education
- landscape templates and resource guides
- water use efficiency tags for plants and irrigation devices at local nurseries
- training and workshops for certifying landscape designers
- rebates for Water Smart Irrigation Controllers
- ordinances

Through the implementation of the CUWCC's DMMs and the passage of ordinances, IWA should be able to realize a significant reduction in residential demands for indoor water use. City plumbing codes should also be reviewed and updated to ensure that they do not impede the efforts of water conservation initiatives.

The following measures are specifically recommended as part of IWA's CMP:

- New Ordinances
- Re-landscaping of municipally owned lands, including medians
- Rebates for residential turf replacement
- Smart Controller Rebate Program

8.1 Conservation Master Plan Programs and Measures

8.1.1 New Ordinances

Local ordinances that promote water conservation and prohibit water wasting can yield high volume, cost-effective water savings. The City of Indio may want to consider ordinances that target not only the residential Customer Class but also the CII water Customer Classs. Ordinances targeting outdoor water use will yield the greatest water savings and should be given the highest priority. Ordinances promoting water efficient fixtures indoors also should be considered as they will yield cumulative water savings and assist IWA in fulfilling obligations as a signatory to the CUWCC's MOU. The sooner that new ordinances can be approved, the greater their impact will be.

Water Efficient Landscaping in Residential New Construction Ordinance

The implementation of proactive ordinances for new construction can have a profound impact on water conservation and the ability of IWA to cost-effectively meet their water conservation goals. An ordinance requiring water efficient landscaping for all new residential construction should be seriously considered. The proposed MCP achieves desert landscaping at 40 percent of all City of Indio homes and apartments building by 2020 and 80 percent by 2030. Based on new account projections for the two Customer Classs, by 2020 the City could attain water efficient landscaping at 26 percent of all single-family homes and 20 percent of multi-family accounts solely through such an ordinance. Savings in addition to those projected under the MCP could be realized if the ordinance was broad sweeping for all new construction including commercial and industrial.

Residential ULFT Retrofit Ordinances

Another ordinance to be considered is one prohibiting the sale and installation of non ULFTs (rated to greater than 1.6 gpf). The State of California is currently considering such legislation (CUWCC, 2007). The City of Indio could also consider an ordinance requiring the installation of ULFTs upon resale. Such an ordinance would enable IWA to achieve their retrofit goals under the CUWCC's MOU and realize water savings that exceed those of the MCP (4 percent per year = natural replacement rate), yielding an additional 2.9 percent in the rate of retrofits compared to natural replacement only. The CUWCC natural replacement rate for toilets assumes that the toilets replaced have had a life of 30 years.

IWA may also want to consider an ordinance requiring high efficiency plumbing products on all new developments and on all retrofits that go beyond 1991 plumbing code requirements. The City could also enact an ordinance that requires the installation of low flush toilets ($\leq$ 1.6 gpf) on all resale homes, for those built prior to 1992.

Ordinance Water Savings

Potential water savings from the proposed ordinances were developed and are presented in Table 8-1.

Table 8-1
Potential Water Savings from Proposed Ordinances

Ordinance	Water Savings (AFY)	
	2015	2020
1. New residential construction desert landscaping	900	2,000
2. Prohibition of sale/installation of non-ULFTs	Up to 50	Up to 100
3. ULFT retrofit upon resale	Up to 18	Up to 35

8.1.2 Municipal Re-landscaping

A very important component of the residential re-landscaping program is the re-landscaping of municipal lands with water efficient desert landscapes. This program should be given the highest priority as it will provide residents and community leaders with demonstration gardens illustrating the types of plants to be planted, the water savings from conversion from sod, and the potential diversity and beauty of desert landscapes. The demonstration gardens will be essential for the public outreach and education components of IWA's Residential Landscaping Conservation Program. This program should target municipal properties currently in sod and also all medians. Potential water savings are presented in Table 8-2.

Table 8-2
Potential Water Savings from a Municipal Re-Landscaping Program

Program	Water Savings (AFY)	
	2015	2020
Re-landscaping of Municipal properties and medians	400	1,000

Landscape design is a planning approach that should integrate elements that will reduce water use. Landscaping for water conservation can include one or more of the following to reduce water use: plant type (native, low water use), minimizing narrow paths or steep areas that produce inefficient irrigation, plant groups with similar irrigation requirements, regular maintenance of irrigation equipment, fertilizer, aeration, mulch, and reduced irrigation areas in new developments. To encourage retrofit of turf with low water demand landscaping, utilities have implemented rebate programs to encourage turf removal. Rebate programs have been successful in facilitating conservation efforts in other cities.

8.1.3 Smart Controller Program

The Smart Controller Program, which offers rebates to customers for replacing standard landscape controllers with new smart controllers, is already a component of IWA's current conservation program. The new controllers are able to calculate irrigation needs as a function of

the type of landscaping and changes in weather and soil conditions. Each controller installed through the program could reduce irrigation demands by 30 percent. IWA should continue to market this program to area residents and CII customers, but also focus on HOA boards and MF accounts.

8.1.4 Water Smart Landscape Rebate Program

IWA also currently has a Water Smart Landscaping Rebate Program. This program assists residents, business owners, and developers in replacing water intensive landscaping with low water usage plants and desert landscapes. The program offers rebates of $1.00 per square foot of turf removed up to $750 per residence and $1500 per commercial property. IWA should continue to market this program to area residents, CII customers, and HOA boards and should ensure that City ordinances do not conflict with the goals of this program.

IWA should provide certification workshops to local landscape designers to ensure that designers are aware of and utilize water efficient practices and plants. A list of certified landscape designers should be provided to residents, developers, and business owners.

The Water Smart Landscape Rebate Program is the centerpiece of IWA's conservation program due to the potential savings that could result from it. Potential water savings in the residential Customer Class resulting from this program are presented in Table 8-3.

Table 8-3
Potential Water Savings from the Water Smart Landscape Rebate Program

Program	Water Savings (AFY)	
	2015	2020
Water Smart Landscape Rebate Program	1,550	2,750

These savings values assume that a water efficient landscaping ordinance for new construction is passed in 2010 and that any new residences after 2010 would not need to participate in this program.

Under their 5-year plan, IWA's target would be to replace turf with water efficient landscaping at approximately 1,350 existing single-family homes and at 44 existing multi-family residential accounts by 2015. These are 6.4 and 10.0 percent of the 2015 total projected homes and accounts, respectively. On an annual basis, this amounts to 270 single family homes and 9 multi-family accounts that convert sod landscapes to water efficient desert landscapes annually.

8.2 Schedule

The programs in this plan are proposed to be initiated over the five-year period for FY's 2010 through 2014. An implementation schedule for the programs in this plan is provided for each fiscal year. The schedule does not include programs associated with CUWCC's DMMs.

8.2.1 Fiscal Year 2010

- Draft Indoor Water Conservation Ordinance.
- Draft ULFT Retrofit Ordinance.
- Identify three high-profile municipal properties to be re-landscaped and serve as demonstration gardens.
- Develop demonstration garden designs, develop and install on-site public information placards regarding the changes and potential water savings and begin installation.
- Develop certification program for licensed landscapers.
- Achieve turf replacement in 1 percent of single-family residential homes.
- Develop and establish robust tracking program for all conservation programs.

8.2.2 Fiscal Year 2011

- Finish installation of design gardens and organize a ribbon cutting ceremony that provides City Council members and public with garden tours and discussions on water savings.
- Design and install desert landscapes at municipal buildings and in medians achieving 11 percent of municipal lands re-landscaped by end of year.
- Initiate and maintain certification program for licensed landscapers.
- Continue to promote Smart Controller and Re-landscaping Rebate programs.
- Achieve turf replacement in 3 percent of single-family residential homes.
- Maintain and expand tracking program as necessary.
- Submit for approval the Water Efficient Landscaping Ordinance for New Residential Construction.
- Submit for approval the Draft Indoor Water Conservation Ordinance.
- Submit for approval the ULFT Retrofit Ordinance.
- Begin implementation of DMM programs as specified in Table 7-5.

8.2.3 Fiscal Year 2012

- Design and install desert landscapes at municipal buildings and in medians achieving 17 percent of municipal lands re-landscaped by end of year.

- Maintain certification program for licensed landscapers.
- Maintain and improve tracking program as necessary.
- Continue to promote Smart Controller and Re-landscaping Rebate programs.
- Achieve turf replacement in 5 percent of single-family residential homes built prior to 2011.
- Begin implementation of remaining DMM programs as specified in Table 7-5.
- Maintain previously implemented DMM programs.

8.2.4 Fiscal Year 2013

- Design and install desert landscapes at municipal buildings and in medians achieving 24 percent of municipal lands re-landscaped by end of year.
- Maintain certification program for licensed landscapers.
- Maintain and improve tracking program as necessary.
- Continue to promote Smart Controller and Re-landscaping Rebate programs.
- Achieve turf replacement in 10 percent of single-family residential homes.
- Maintain previously implemented DMM programs.

8.2.5 Fiscal Year 2014

- Design and install desert landscapes at municipal buildings and in medians achieving 31 percent of municipal lands re-landscaped by end of year.
- Maintain certification program for licensed landscapers.
- Maintain and improve tracking program as necessary.
- Continue to promote Smart Controller and Re-landscaping Rebate programs.
- Achieve turf replacement in 16.5 percent of single-family residential homes.
- Maintain previously implemented DMM programs.

8.3 Budget

A five-year budget was developed corresponding to the five-year implementation schedule and is presented in Table 8-4. The average annual budget for the Municipal Re-landscaping Program is $100,000. Only $50,000 has been budgeted for its first year of implementation as IWA will likely not yet be installing any new landscapes. However, a budget of $150,000 is estimated for the second year to account for additional costs for the placards and public events associated with the demonstration gardens. Budgets for the Residential Re-landscaping and Smart Controller Programs have been combined as these two programs achieve water savings from the same pool of water demands (residential outdoor water use). The estimated budgets for these two programs

are based on the targets presented in the program schedule (Section 8.2) and assume that IWA provides the maximum $750 per account for re-landscaping.

Table 8-4
Estimated Costs for the 5-year Implementation of Key Conservation Strategies

Program	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	5-Year Budget
Municipal Re-landscaping	$50,000	$150,000	$100,000	$100,000	$100,000	$500,000
Residential Re-landscaping & Smart Controller Program	$460,600	$ 460,600	$ 460,600	$ 460,600	$460,600	$2,303,000
DMMs	$479,700	$576,700	$647,500	$663,000	$679,100	$3,046,000
Annual Estimated Costs	$990,300	$1,187,300	$1,208,100	$1,223,600	$1,239,700	$5,849,000
Water Saved	400	900	1,370	1,850	2,340	6,900
Unit Cost ($/AF saved)	$2,251	$1,298	$877	$661	$533	$877

In the 2009 California Water Plan, DWR estimated that utilities spend between $233 and $540 per AF of water saved for cost effective water conservation measures. From the projected budgets in Table 8-4, IWA's initial expenditures in comparison to water saved are several times larger than DWR's estimated values. However, it is expected that, as programs are implemented and maintained, greater annual water savings will be seen, bringing IWA's expenditures in line with DWR's values. The budget for the Conservation Coordinator Program is the single largest budgetary item. Since IWA's Conservation Coordinator serves also as their Environmental Programs Coordinator, overseeing not only water conservation but also other environmental programs within the City of Indio, it may not be appropriate to attribute all of this program's costs to the conservation program. If 50 percent of the program's budget is for conservation, then the unit cost of water savings would range from $1,720 to $420 for years 2010 to 2014, respectively.

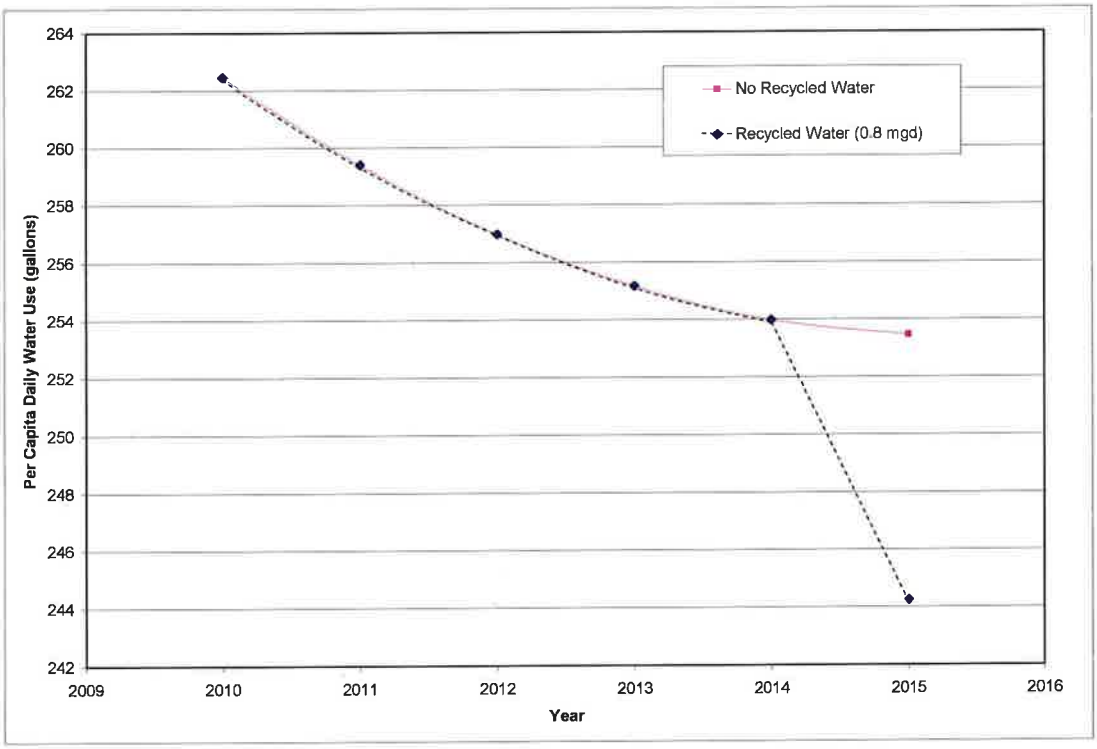
8.4 Targeted Per Capita Water Savings

The CMP has been designed to achieve at least a 20 percent reduction in the baseline per capita water use rate for all demand Customer Classes by 2020. IWA's baseline per capita water usage rate (2002-2008 average) has been estimated as 285 gpcd. Since 2002, the City's per capita daily water use rate has been steadily declining as a result of new development and conservation efforts. In the 2002-2008 six year period, the gpcd dropped from 275 in 2002 to 255 in 2008. Accounting for growth in all Customer Classes, the WEAP model estimates that the City of Indio's daily use rate for 2010 will be approximately 262 gpcd. This is a 9 percent decrease from the baseline rate. The targeted per capita water use rate for 2020 is 228 gpcd.

To meet this target, IWA will need to achieve water savings as proposed in this CMP and construct a WRF to supply irrigators with reclaimed water instead of the potable groundwater

they currently receive. Figure 8-1 illustrates the resulting changes in per capita water usage through 2015. According to population and demand forecasts, IWA should project to achieve a per capita water use rate of 244 gpcd by 2015 in order to be on track to achieve 228 gpcd by 2020. For the purposes of this CMP, was assumed that a WRF will be brought online in 2015, initially supplying 0.8 mgd and ramping up to 4 mgd in 5 years (2020). Figure 8-1 illustrates the targeted annual water use rates for 2010 through 2015.

Figure 8-1
Per Capita Daily Water Usage (gallons) Through 2015 with CMP Programs Both With and Without a WRF Online in 2015



The values presented in Figure 8-1 are per capita water use rates for all demand Customer Classes. Table 8-5 presents the per capita water usage for 2010 through 2015 for All Customer Classes and for the SF residential Customer Class only.